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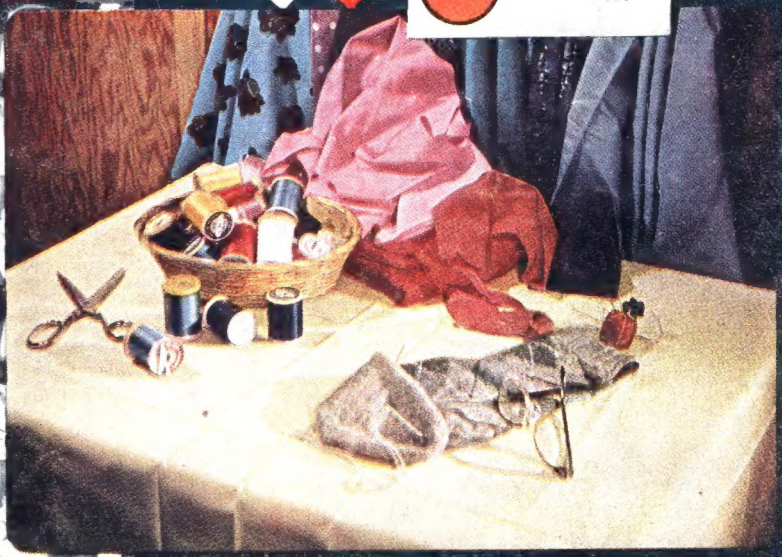
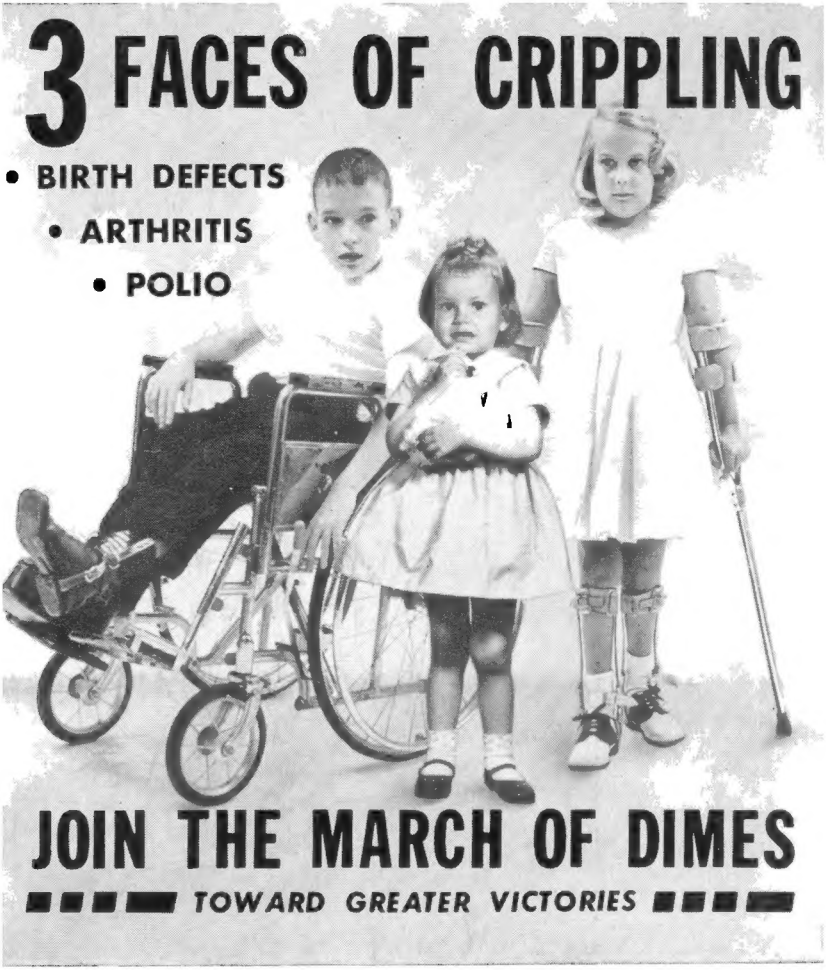


# COLOR VISION

## The Land Experiments

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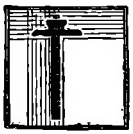
# THE WORD AND THE TRUTH

*In the beginning was the Word and the Word was with God and the Word was God.*

John



THE concept "Truth" is one of the thorniest problems Man has ever to deal with — and "ever" there is used both in the sense of "forever" and in the sense "at any time."

The majority of science-fiction readers have been oriented toward the scientific concept of "truth"; it seems, to us, the right, natural, "of course, what else?" concept. Actually, the scientist is oriented specifically against an important alternative meaning of "truth."

The Liberal Arts student, on the other hand, is oriented toward a quite different concept of "truth," one that rejects the meaning the scientist is trained to hold.

Most of us have hassled out the problem—frequently without knowing that was the problem we were actually struggling with!—hundreds of times. And, almost invariably, with no useful results; the Liberal Arts student can't be convinced of the error of his thinking, and the science student can't see the "obvious" flaws in his understandings.

Look, friends; any and every time that you can't resolve a problem by debate—every time without exception that you can not work out an honestly accepted agreement with someone else —it invariably means that you *both* need to learn something. You're *both*

wrong. If you're absolutely, perfectly, totally right—then you sure need to learn some new techniques of communication, because you're obviously not getting it over. What good does it do to have the right answer if you can't communicate it? Therefore, so long as you and your debate opponent remain in disagreement, you *both* need to learn.

This business of "Truth" is one I've been having troubles with for the last thirty years; science-fictioneers are particularly faced with the problem, because neither scientist in the strict sense, nor liberal arts man will agree with the science-fictioneer as to what "truth" means.

The problem was, essentially, this: Was it, as of 1935, possible to build nuclear weapons and rocketships capable of delivering them under robot control? Was it, at that time, possible to build ships capable of reaching Mars?

That is, was it The Truth that those things could be done?

Well, as of that time, Dr. Millikan stated that atomic energy was theoretically possible—but certainly not in our lifetimes—not for at least two hundred fifty years.

Astronomer Moulton, in his textbook "Astronomy", in 1931 had started his discussion of meteors by stating flatly that "Many a story has been written of some miraculous journey to the moon or Mars . . . There is no hope, however, that such a wish will ever be realized. The difficulty of escaping Earth's gravity is insuperable; the problem of directing a journey through celestial spaces and that of descending gently to rest on the surface of another gravitating body are equally formidable. Only those who are unfamiliar with the physical forces involved believe that such adventures will ever pass beyond the realms of fancy." *

The science-fictioneer found himself in a strange position; he disagreed with the professional, highly trained specialists in the fields of science which he, as a science-fictioneer, necessarily discussed. Yet he claimed to base his ideas on scientific Truths! Millikan, a leading nuclear physicist of the time, flatly denied the possibility of atomic power within the foreseeable future while Moulton, an astrophysicist, denied the possibility of there *ever* being a usable spaceship. Moulton, notice, did not limit his denial as Millikan did—Moulton specifically and flatly stated that "there is no hope that such a wish will *ever* be realized."

Then what was my position, as a member of the group "science-fictioneers," in 1935? Did I accept scientific Truths, or did I, like the Liberal Artist, hold that everything is just a matter of human opinion? But if I held the latter, then I was obviously wrong, because the consensus of those human opinions was, quite obviously, that spaceships and atomic power were impossible fancies.

The science-fictioneer's position was—and, if we are still science-fic-

*Forest Ray Moulton, *Astronomy*, P. 296. Published 1931 by The Macmillan Co., New York City.

tioneers, in the same pioneering sense, still is—logically indefensible. *If* we base our thinking on scientific Truths, *then* we must accept Moulton's statement that spaceships are forever impossible. *If,* on the other hand, we insist that "it's all a matter of opinion," *then* we're wrong, because opinion holds the same as Moulton, Millikan, *et al.*

Oh, sure . . . it's easy to say, as of 1960 A.D., "Well . . . you see we were right, don't you? Moulton and Millikan were wrong, weren't they, just as we said!"

And I know of no one, scientist, science-fictioneer, or Liberal Artist that can tell, before the event—which is the only time it's really useful!—who's right and who's wrong. And most of the confusion and argument boils around the term "Truth."

Now there's an interesting thing about the Russian word *pravda,* usually translated "truth." In the Russian concept, *pravda* does not mean what Western philosophers mean by *truth;* the difference is subtle but critically important. *

To the Russian, *pravda* meant something best translated into English as "the word—the official statement."

It's easy to miss such subtle differences of connotation. For instance, in Spanish, there is the word *pueblo,* which is, in most English-Spanish dictionaries, translated as "village, town." Well . . . it is, and it isn't. The difficulty becomes an impossibility when you try to talk about "a deserted village." Reason: *pueblo* actually refers to the people, the population, the group, that inhabits and thereby generates the village, *not* to the architectural structures they inhabit. Talking about "a deserted *peublo*" then is like referring to "a depopulated population," or "an iron-free solution of ferrous sulphate."

The Russians are not fools; the Spanish are not fools. But the Russian concept *pravda,* and the Spanish concept *pueblo* differ critically from the English concepts "truth" and "village" in essentially the same way; the non-English terms are purely subjective-non-objective concepts, purely humanistic concepts, It's people who make Russian *pravda,* and people, not things, that make Spanish *pueblos.*

Unfortunately, a Russian must use the term *pravda* whether he's trying to talk about what Lysenko said, or about the laws of Nature themselves. He has only one term to refer to the latest statement of the Party Line—it's the Official Statement, and therefore by definition, *pravda*—or the fact that iron dissolves in nitric acid. Both can be referred to only by the single term *pravda,* without distinction.

*Be it noted: Russian philosophy has, in the past forty years, undergone some rather violent changes. Before 1920, Russia was decidedly not a scientific-technical nation. Now, of course, it is painfully evident that Russia is a major technological power. During that forty-year period, the meanings of words have, necessarily, undergone subtle shifts. What *pravda* meant to Tolstoy or Lenin, for example, is certainly not what it means to the Russian technologists working in nucleonics and rocketry. This discussion here refers primarily to the pre-1920 meaning of *pravda.* If you doubt that words change drastically in meaning in a short period—consider the difference between the implication-meaning of *authority* as of 1920 in the United States and its implication-meaning A.D. 1960.

We can see fairly clearly that there's an inherent distinction between the official statements of the Party line, and the fact that iron dissolves in nitric acid.

Yes . . . but, friend, *you have only one term for the two things too!* Look: "It's a violation of the law to practice medicine without a license, and that's the truth." And, "Creating or annihilating energy is a violation of the law of conservation of energy, and that's the truth."

Like the Russian, you, too, have only a single term for two totally different kinds of things! The Scientist wants "truth" to mean "the objective, nonhuman reality of the observable Universe," which will give his work a maximum value. The Liberal Artist, on the other hand, wants "truth" to mean "the consensus of scholarly opinion," which will give *his* work maximum value.

The only trouble with that setup is that, actually, a scientist's work will have maximum value in human terms if his strictly human-opinion-statements are assumed to be Laws of the Universe. That is, if Moulton's statements anent the forever-impossibility of spaceships are taken as being laws-of-nature, Moulton's effect on human beings will be a maximum.

The Prophets of old had an additional gimmick; in effect they said, "I speak with my voice, but the statements are the Word of God." What they meant by "truth" was something very closely akin to the sort of thing Moulton was, actually, saying, save that Moulton would have said that the statements were the Word of Science.

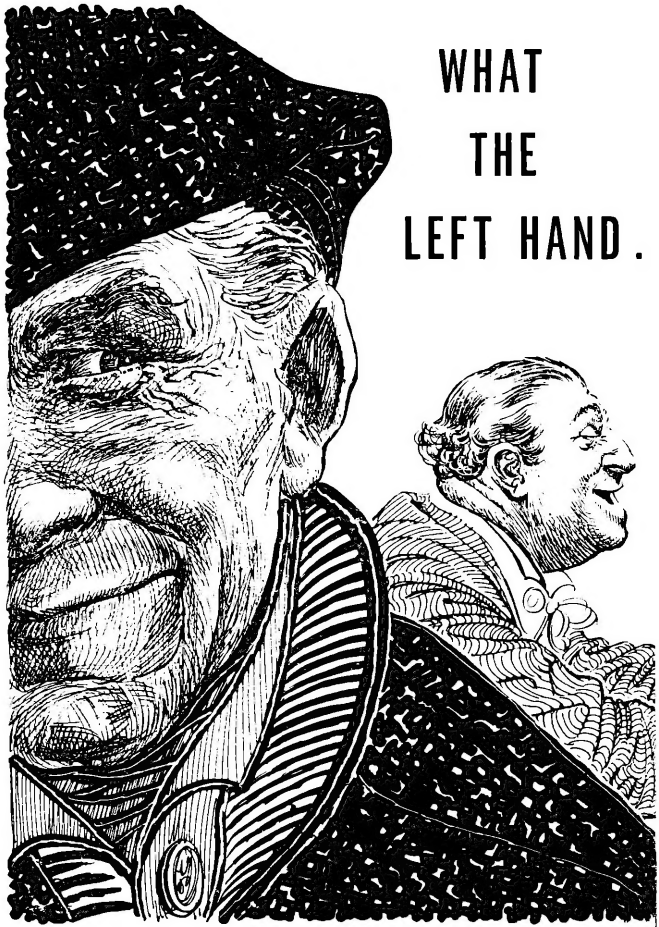
What we need as badly as the Russians need an alternative to *pravda* is an alternative to "truth." Nobody wants it; each individual wants his statements to have maximum effect in influencing the belief-patterns of those around him. The Absolute, the Ultimate Law, obviously has the maximum possible influencing power. If I can make you believe that my statements are Absolute Ultimate Law, my statements will have maximum influencing power. If "truth" means "the Absolute, the Ultimate Law," then I will want to claim "I speak the Truth!" because that will influence you most.

It will, also, comfort me most. That is, if I can believe that I know the Truth, then I am safe, secure, protected. I am safe, and they, poor fools, who know not the Truth, are endangered. I know the Truth; I am superior to them.

Jesus had comments to make on that subject; the Pharisees of New Testament times were a sect of super-orthodox Jews who lived by the letter of the Mosaic Law. Jesus didn't particularly approve of the Pharisee's comment, "I thank Thee, God, that I am not such as they!" But it *is* a very warm, secure, comfortable feeling to know that you know the Truth, the Absolute, Ultimate Law.

Moulton must have felt a kind of warm security when he, not unlike the Pharisee of old, wrote "Only those who are unfamiliar with the physical

(*Continued on page* 176)


WHAT
THE
LEFT HAND.

*There is no lie so totally convin*
*ing as something the other fello*
*already knows-for-sure is the truti*
*And no cover-story so convincing.*

# ...WAS DOING

## By DARRELL T. LANGART

Illustrated by Freas

HE building itself was unprepossessive enough. It was an old-fashioned, six-floor, brick structure that had, over the years, served first as a private home, then as an apartment building, and finally as the headquarters for the organization it presently housed.

It stood among others of its kind in a lower-middle-class district of Arlington, Virginia, within howitzer range of the capitol of the United States, and even closer to the Pentagon. The main door was five steps up from the sidewalk, and the steps were flanked by curving balustrades of ornamental ironwork. The entrance itself was closed by a double door with glass panes, beyond which could be seen a small foyer. On both doors, an identical message was blocked out in neat gold letters: *The Society For Mystical and Metaphysical Research, Inc.*

It is possible that no more nearly perfect cover, no more misleading front for a secret organization ever existed in the history of man. It possessed two qualities which most other cover-up titles do not have. One, it was so obviously crackpot that no one paid any attention to it except crackpots, and, two, it was perfectly, literally true.

Spencer Candron had seen the building so often that the functional beauty of the whole setup no longer impressed him as it had several years before. Just as a professional actor is not impressed by being allowed backstage, or as a multimillionaire considers expensive luxuries as commonplace, so Spencer Candron thought of nothing more than his own personal work as he climbed the five steps and pushed open the glass-paned doors.

Perhaps, too, his matter-of-fact attitude was caused partially by the analogical resemblance between himself and the organization. Physically, Candron, too, was unprepossessing. He was a shade less than five eight, and his weight fluctuated between a hundred and forty and a hundred and forty-five, depending on the season and his state of mind. His face consisted of a well-formed snub nose, a pair of introspective gray eyes, a rather wide, thin-lipped mouth that tended to smile even when relaxed, a high, smooth forehead, and a firm cleft chin, plus the rest of the normal equipment that normally goes to make up a face. The skin was slightly tanned, but it was the tan of a man who goes to the beach on summer weekends, not that of an outdoorsman. His hands were strong and wide and rather large; the palms were uncalloused and the fingernails were clean and neatly trimmed. His hair was straight and light brown, with a pronounced widow's peak, and he wore it combed back and rather long to conceal the fact that a thin spot had appeared on the top rear of his scalp. His clothing was conservative and a little out of style, having been bought in 1981, and thus three years past being up-to-date.

Physically, then, Spencer Candron, was a fine analog of the Society. He

looked unimportant. On the outside, he was just another average man whom no one would bother to look twice at.

The analogy between himself and the S.M.M.R. was completed by the fact that his interior resources were vastly greater than anything that showed on the outside.

The doors swung shut behind him, and he walked into the foyer, then turned left into the receptionist's office. The woman behind the desk smiled her eager smile and said, "Good morning, Mr. Candron!"

Candron smiled back. He liked the woman, in spite of her semifanatic overeagerness, which made her every declarative sentence seem to end with an exclamation point.

"Morning, Mrs. Jesser," he said, pausing at the desk for a moment. "How have things been?"

Mrs. Jesser was a stout matron in her early forties who would have been perfectly happy to work for the Society for nothing, as a hobby. That she was paid a reasonable salary made her job almost heaven for her.

"Oh, just *fine,* Mr. Candron!" she said. "Just *fine!*" Then her voice lowered, and her face took on a serious, half conspiratorial expression. "Do you know what?"

"No," said Candron, imitating her manner. "What?"

"We have a gentleman . . . he came in yesterday . . . a *very* nice man . . . and very intelligent, too. And, you know what?"

Candron shook his head. "No," he repeated. "What?"

Mrs. Jesser's face took on the self-pleased look of one who has important inside knowledge to impart. "He has actual photographs . . . three-D, full-color *pho*tographs . . . of the con*trol* room of a flying saucer! And one of the Saucerites, too!"

"Really?" Candron's expression was that of a man who was both impressed and interested. "What did Mr. Balfour say?"

"Well—" Mrs. Jesser looked rather miffed. "I don't really *know!* But the gentleman is supposed to be back to*mor*row! With some *more* pictures!"

"Well," said Candron. "Well. That's really fine. I hope he has something. Is Mr. Taggert in?"

"Oh, yes, Mr. Candron! He said you should go on up!" She waved a plump hand toward the stairway. It made Mrs. Jesser happy to think that she was the sole controller of the only way, except for the fire escape, that anyone could get to the upper floors of the building. And as long as she thought that, among other things, she was useful to the Society. Someone had to handle the crackpots and lunatic-fringe fanatics that came to the Society, and one of their own kind could do the job better than anyone else. As long as Mrs. Jesser and Mr. Balfour were on duty, the Society's camouflage would remain intact.

Spencer Candron gave Mrs. Jesser a friendly gesture with one hand and then headed up the stairs. He would rather not have bothered to take the stairway all the way up to the fifth floor, but Mrs. Jesser had sharp ears,

and she might wonder why his footsteps were not heard all the way up. Nothing—but *nothing*—must ever be done to make Mrs. Jesser wonder about anything that went on here.

The door to Brian Taggert's office was open when Candron finally reached the fifth floor. Taggert, of course, was not only expecting him, but had long been aware of his approach.

Candron went in, closed the door, and said, "Hi, Brian," to the dark-haired, dark-eyed, hawk-nosed man who was sprawled on the couch that stood against one corner of the room. There was a desk at the other rear corner, but Brian Taggert wasn't a desk man. He looked like a heavyweight boxer, but he preferred relaxation to exercise.

But he did take his feet from the couch and lift himself to a sitting position as Candron entered. And, at the same time, the one resemblance between Taggert and Candron manifested itself—a warm, truly human smile.

"Spence," he said warmly, "you look as though you were bored. Want a job?"

"No," said Candron, "but I'll take it. Who do I kill?"

"Nobody, unless you absolutely have to," said Taggert.

Spencer Candron understood. The one thing that characterized the real members of The Society for Mystical and Metaphysical Research—not the "front" members, like Balfour and Mrs. Jesser, not the hundreds of "honorable" members who constituted the crackpot portion of the membership, but the real core of the group—the thing that characterized them could be summed up in one word: *understanding*. Without that one essential property, no human mind can be completely free. Unless a human mind is capable of understanding the only forces that can be pitted against it—the forces of other human minds—that mind cannot avail itself of the power that lies within it.

Of course, it is elementary that such understanding must also apply to oneself. Understanding of self must come before understanding of others. *Total* understanding is not necessary—indeed, utter totality is very likely impossible to any human mind. But the greater the understanding, the freer the mind, and, at a point which might be called the "critical point," certain abilities inherent in the individual human mind become controllable. A change, not only in quantity, but in quality, occurs.

A cube of ice in a glass of water at zero degrees Celsius exhibits certain properties and performs certain actions at its surface. Some of the molecules drift away, to become one with the liquid. Other molecules from the liquid become attached to the crystalline ice. But the ice cube remains essentially an entity. Over a period of time, it may change slowly, since dissolution takes place faster than crystallization at the corners of the cube. Eventually, the cube will become a sphere, or something very closely approximating it. But the

change is slow, and, once it reaches that state, the situation becomes static.

But, if you add heat, more and more and more, the ice cube will change, not only its shape, but its state. What it was previously capable of doing only slightly and impermanently, it can now do completely. The critical point has been passed.

Roughly—for the analog itself is rough—the same things occurs in the human mind. The psionic abilities of the human mind are, to a greater or lesser degree, there to begin with, just as an ice cube has the *ability* to melt if the proper conditions are met with.

The analogy hardly extends beyond that. Unlike an ice cube, the human mind is capable of changing the forces outside it—as if the ice could seek out its own heat in order to melt. And, too, human minds vary in their inherent ability to absorb understanding. Some do so easily, others do so only in spotty areas, still others cannot reach the critical point before they break. And still others can never really understand at all.

No one who had not reached his own critical point could become a "core" member of the S.M.M.R. It was not snobbery on their part; they understood other human beings too well to be snobbish. It was more as though a Society for Expert Mountain Climbers met each year on the peak of Mount Everest—anyone who can get up there to attend the meeting is automatically a member.

Spencer Candron sat down in a nearby chair. "All right, so I refrain from doing any more damage than I have to. What's the objective?"

Taggert put his palms on his muscular thighs and leaned forward. "James Ch'ien is still alive."

Candron had not been expecting the statement, but he felt no surprise. His mind merely adjusted to the new data. "He's still in China, then," he said. It was not a question, but a statement of a deduction. "The whole thing was a phony. The death, the body, the funeral. What about the executions?"

"They were real," Taggert said. "Here's what happened as closely as we can tell:

"Dr. Ch'ien was kidnaped on July 10th, the second day of the conference in Peiping, at some time between two and three in the morning. He was replaced by a double, whose name we don't know. It's unimportant, anyway. The double was as perfect as the Chinese surgeons could make him. He was probably not aware that he was slated to die; it is more likely that he was hypnotized and misled. At any rate, he took Ch'ien's place on the rostrum to speak that afternoon.

"The man who shot him, and the man who threw the flame bomb, were probably as equally deluded as to what they were doing as the double was. They did a perfect job, though. The impersonator was dead, and his skin was charred and blistered clear up to the chest—no fingerprints.

"The men were tried, convicted, and executed. The Chinese government sent us abject apologies. The double's body was shipped back to the United States with full honors, but by the time it reached here, the eye-cone patterns had deteriorated to the point where they couldn't be identified any more than the fingerprints could. And there were half a hundred reputable scientists of a dozen friendly nations who were eyewitnesses to the killing and who are all absolutely certain that it was James Ch'ien who died."

Candron nodded. "So, while the whole world was mourning the fact that one of Earth's greatest physicists has died, he was being held captive in the most secret and secure prison that the Red Chinese government could put him in."

Taggert nodded. "And your job will be to get him out," he said softly.

Candron said nothing for a moment, as he thought the problem out. Taggert said nothing to interrupt him.

Neither of them worried about being overheard or spied upon. Besides being equipped with hush devices and blanketing equipment, the building was guarded by Reeves and Donahue, whose combined senses of perception could pick up any activity for miles around which might be inimical to the Society.

"How much backing do we get from the Federal Government?" Candron asked at last.

"We can swing the cover-up afterwards all the way," Taggert told him firmly. "We can arrange transportation back. That is, the Federal Government can. But getting over there and getting Ch'ien out of durance vile is strictly up to the Society. Senator Kerotski and Secretary Gonzales are giving us every opportunity they can, but there's no use approaching the President until after we've proven our case."

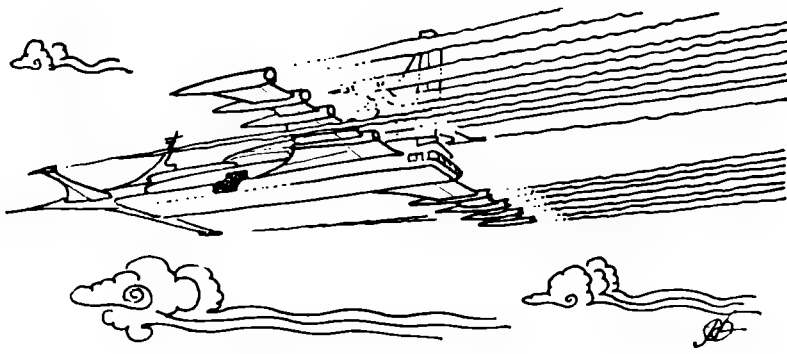
Candron gestured his understanding. The President of the United States was a shrewd, able, just, and ethical human being—but he was not yet a member of the Society, and perhaps would never be. As a consequence it was still impossible to convince him that the S.M.M.R. knew what it was talking about—and that applied to nearly ninety per cent of the Federal and State officials of the nation.

Only a very few knew that the Society was an *ex officio* branch of the government itself. Not until the rescue of James Ch'ien was an accomplished fact, not until there was physical, logical proof that the man was still alive would the government take official action.

"What's the outline?" Candron wanted to know.

Taggert outlined the proposed course of action rapidly. When he was finished, Spencer Candron simply said, "All right. I can take care of my end of it." He stood up. "I'll see you, Brian."

Brian Taggert lay back down on the couch, propped up his feet, and



winked at Candron. "Watch and check, Spence."

Candron went back down the stairs. Mrs. Jesser smiled up at him as he entered the reception room. "Well! That didn't take long! Are you leaving, Mr. Candron?"

"Yes," he said, glancing at the wall clock. "Grab and run, you know. I'll see you soon, Mrs. Jesser. Be an angel."

He went out the door again and headed down the street. Mrs. Jesser had been right; it hadn't taken him long. He'd been in Taggert's office a little over one minute, and less than half a dozen actual words had been spoken. The rest of the conversation had been on subtler level, one which was almost completely nonverbal. Not that Spencer Candron was a telepath; if he had been, it wouldn't have been necessary for him to come to the headquarters building. Candron's talents simply didn't lie along that line. His ability to probe the minds of normal human beings was spotty and unreliable at best. But when two human beings understand each other at the level that existed between members of the Society, there is no need for long-winded discourses.

The big stratoliner slowed rapidly as it approached the Peiping People's Airfield. The pilot, a big-boned Britisher who had two jobs to do at once, watched the airspeed indicator. As the needle dropped, he came in on a conventional landing lane, aiming

for the huge field below. Then, as the needle reached a certain point, just above the landing minimum, he closed his eyes for a fraction of a second and thought, with all the mental power at his command: *NOW!*

For a large part of a second, nothing happened, but the pilot knew his message had been received.

Then a red gleam came into being on the control board.

"What the hell?" said the co-pilot.

The pilot swore. "I *told* 'em that door was weak! We've ripped the luggage door off her hinges. Feel her shake?"

The co-pilot looked grim. "Good thing it happened now instead of in mid-flight. At that speed, we'd been torn apart."

"*Blown* to bits, you mean," said the pilot. "Let's bring her in."

By that time, Spencer Candron was a long way below the ship, falling like a stone, a big suitcase clutched tightly in his arms. He knew that the Chinese radar was watching the jetliner, and that it had undoubtedly picked up two objects dropping from the craft—the door and one other. Candron had caught the pilot's mental signal—anything that powerful could hardly be missed—and had opened the door and leaped.

But those things didn't matter now. Without a parachute, he had flung himself from the plane toward the earth below, and his only thought was his loathing, his repugnance, for that too, too solid ground beneath.

He didn't hate it. That would be deadly, for hate implies as much attraction as love—the attraction of destruction. Fear, too, was out of the question; there must be no such relationship as that between the threatened and the threatener. Only loathing could save him. The earth beneath was utterly repulsive to him.

And he slowed.

His mind would not accept contact with the ground, and his body was forced to follow suit. He slowed.

Minutes later, he was drifting fifty feet above the surface, his altitude held steady by the emotional force of his mind. Not until then did he release the big suitcase he had been holding. He heard it thump as it hit, breaking open and scattering clothing around it.

In the distance, he could hear the faint moan of a siren. The Chinese radar had picked up two falling objects. And they would find two: one door and one suitcase, both of which could be accounted for by the "accident." They would know that no parachute had opened; hence, if they found no body, they would be certain that no human being could have dropped from the plane.

The only thing remaining now was to get into the city itself. In the darkness, it was a little difficult to tell exactly where he was, but the lights of Peiping weren't far away, and a breeze was carrying him toward it. He wanted to be in just the right place before he set foot on the ground.

By morning, he would be just another one of the city's millions.

Morning came three hours later. The sun came up quietly, as if its sole purpose in life were to make a liar out of Kipling. The venerable old Chinese gentleman who strolled quietly down Dragon Street looked as though he were merely out for a placid walk for his morning constitutional. His clothing was that of a middle-class office worker, but his dignified manner, his wrinkled brown face, his calm brown eyes, and his white hair brought respectful looks from the other passers-by on the Street of the Dragon. Not even the thirty-five years of Communism, which had transformed agrarian China into an industrial and technological nation that ranked with the best, had destroyed the ancient Chinese respect for age.

That respect was what Spencer Candron relied on to help him get his job done. Obvious wealth would have given him respect, too, as would the trappings of power; he could have posed as an Honorable Director or a People's Advocate. But that would have brought unwelcome attention as well as respect. His disguise would never stand up under careful examination, and trying to pass himself off as an important citizen might bring on just such an examination. But an old man had both respect and anonymity.

Candron had no difficulty in playing the part. He had known many elderly Chinese, and he understood them well. Even the emotional control of the Oriental was simple to simulate; Candron knew what "emotional control" *really* meant.

You don't control an automobile by throwing the transmission out of gear and letting the engine run wild. Suppressing an emotion is not controlling it, in the fullest sense. "Control" implies guidance and use.

Peiping contained nearly three million people in the city itself, and another three million in the suburbs; there was little chance that the People's Police would single out one venerable oldster to question, but Candron wanted an escape route just in case they did. He kept walking until he found the neighborhood he wanted, then he kept his eyes open for a small hotel. He didn't want one that was too expensive, but, on the other hand, he didn't want one so cheap that the help would be untrustworthy.

He found one that suited his purpose, but he didn't want to go in immediately. There was one more thing to do. He waited until the shops were open, and then went in search of second-hand luggage. He had enough money in his pockets to buy more brand-new expensive luggage than a man could carry, but he didn't want luggage that looked either expensive or new. When he finally found what he wanted, he went in search of clothing, buying a piece at a time, here and there, in widely scattered shops. Some of it was new, some of it was secondhand, all of it fit both the body and the

personality of the old man he was supposed to be. Finally, he went to the hotel.

The clerk was a chubby, blandly happy, youngish man who bowed his head as Candron approached. There was still the flavor of the old politeness in his speech, although the flowery beauty of half a century before had disappeared.

"Good morning, venerable sir; may I be of some assistance?"

Candron kept the old usages. "This old one would be greatly honored if your excellent hostelry could find a small corner for the rest of his unworthy body," he said in excellent Cantonese.

"It is possible, aged one, that this miserable hovel may provide some space, unsuited though it may be to your honored presence," said the clerk, reverting as best he could to the language of a generation before. "For how many people would you require accommodations?"

"For my humble self only," Candron said.

"It can, I think, be done," said the clerk, giving him a pleasant smile. Then his face took on an expression of contrition. "I hope, venerable one, that you will not think this miserable creature too bold if he asks for your papers?"

"Not at all," said Candron, taking a billfold from his inside coat pocket. "Such is the law, and the law of the People of China is to be always respected."

He opened the billfold and spread the papers for the clerk's inspection. They were all there—identification, travel papers, everything. The clerk looked them over and jotted down the numbers in the register book on the desk, then turned the book around. "Your chop, venerable one."

The "chop" was a small stamp bearing the ideograph which indicated the name Candron was using. Illiteracy still ran high in China because of the difficulty in memorizing the tens of thousands of ideographs which made up the written language, so each man carried a chop to imprint his name. Officially, China used the alphabet, spelling out the Chinese words phonetically—and, significantly, they had chosen the Latin alphabet of the Western nations rather than the Cyrillic of the Soviets. But old usages die hard.

Candron imprinted the ideograph on the page, then, beside it, he wrote "Ying Lee" in Latin characters.

The clerk's respect for this old man went up a degree. He had expected to have to put down the Latin characters himself. "Our humble establishment is honored by your esteemed presence, Mr. Ying," he said. "For how long will it be your pleasure to bestow this honor upon us?"

"My poor business, unimportant though it is, will require at least one week; at the most, ten days," Candron said, knowing full well that twenty-four hours would be his maximum, if everything went well.

"It pains me to ask for money in advance from so honorable a gentle-

man as yourself," said the clerk, "but such are the rules. It will be seven and a half yuan per day, or fifty yuan per week."

Candron put five ten-yuan notes on the counter. Since the readjustment of the Chinese monetary system, the yuan had regained a great deal of its value.

A young man who doubled as bellhop and elevator operator took Candron up to the third floor. Candron tipped him generously, but not extravagantly, and then proceeded to unpack his suitcase. He hung the suits in the closet and put the shirts in the clothes chest. By the time he was through, it looked as though Ying Lee was prepared to stay for a considerable length of time.

Then he checked his escape routes, and found two that were satisfactory. Neither led downward to the ground floor, but upward, to the roof. The hotel was eight stories high, higher than any of the nearby buildings. No one would expect him to go up.

Then he gave his attention to the room itself. He went over it carefully, running his fingers gently over the walls and the furniture, noticing every detail with his eyes. He examined the chairs, the low bed, the floor—everything.

He was not searching for spy devices. He didn't care whether there were any there or not. He wanted to know that room. To know it, become familiar with it, make it a part of him.

Had there been any spy devices, they would have noticed nothing unusual. There was only an old man there, walking slowly around the room, muttering to himself as though he were thinking over something important or, perhaps, merely reminiscing on the past, mentally chewing over his memories.

He did not peer, or poke, or prod. He did not appear to be looking for anything. He picked up a small, cheap vase and looked at it as though it were an old friend; he rubbed his hand over the small writing desk as though he had written many things in that familiar place; he sat down in a chair and leaned back in it and caressed the armrests with his palms as though it were an honored seat in his own home. And, finally, he undressed, put on his nightclothes, and lay down on the bed, staring at the ceiling with a soft smile on his face. After ten minutes or so, his eyes closed and remained that way for three-quarters of an hour.

Unusual? No. An old man must have his rest. There is nothing unusual about an old man taking a short nap.

When he got up again, Spencer Candron was thoroughly familiar with the room. It was home, and he loved it.

Nightfall found the honorable Mr. Ying a long way from his hotel. He had, as his papers had said, gone to do business with a certain Mr. Yee, had haggled over the price of certain goods, and had been unsuccessful in establishing a mutual price. Mr. Yee

was later to be able to prove to the People's Police that he had done no business whatever with Mr. Ying, and had had no notion whatever that Mr. Ying's business connections in Nanking were totally nonexistent.

But, on that afternoon, Mr. Ying had left Mr. Yee with the impression that he would return the next day with, perhaps, a more amenable attitude toward Mr. Yee's prices. Then Mr. Ying Lee had gone to a restaurant for his evening meal.

He had eaten quietly by himself, reading the evening edition of the Peiping *Truth* as he ate his leisurely meal. Although many of the younger people had taken up the use of the knife and fork, the venerable Mr. Ying clung to the chopsticks of an earlier day, plied expertly between the thumb and forefinger of his right hand. He was not the only elderly man in the place who did so.

Having finished his meal and his newspaper in peace, Mr. Ying Lee strolled out into the gathering dusk. By the time utter darkness had come, and the widely-spaced street lamps of the city had come alive, the elderly Mr. Ying Lee was within half a mile of the most important group of buildings in China.

The Peiping Explosion, back in the sixties, had almost started World War Three. An atomic blast had leveled a hundred square miles of the city and started fires that had taken weeks to extinguish. Soviet Russia had roared in its great bear voice that the Western Powers had attacked, and was apparently on the verge of coming to the defense of its Asian comrade when the Chinese government had said irritatedly that there had been no attack, that traitorous and counterrevolutionary Chinese agents of Formosa had sabotaged an atomic plant, nothing more, and that the honorable comrades of Russia would be wise not to set off anything that would destroy civilization. The Russian Bear grumbled and sheathed its claws.

The vast intelligence system of the United States had reported that (A) the explosion had been caused by carelessness, not sabotage, but the Chinese had had to save face, and (B) the Soviet Union had no intention of actually starting an atomic war at that time. If she had, she would have shot first and made excuses afterwards. But she *had* hoped to make good propaganda usage of the blast.

The Peiping Explosion had caused widespread death and destruction, yes; but it had also ended up being the fastest slum-clearance project on record. The rebuilding had taken somewhat more time than the clearing had taken, but the results had been a new Peiping—a modern city in every respect. And nowhere else on Earth was there one hundred square miles of *completely* modern city. Alteration takes longer than starting from scratch if the techniques are available; there isn't so much dead wood to clear away.

In the middle of the city, the Chinese government had built its equivalent of the Kremlin—nearly a third

of a square mile of ultra-modern buildings designed to house every function of the Communist Government of China. It had taken slave labor to do the job, but the job had been done.

A little more than half a mile on a side, the area was surrounded by a wall that had been designed after the Great Wall of China. It stood twenty-five feet high and looked very quaint and picturesque.

And somewhere inside it James Ch'ien, American-born physicist, was being held prisoner. Spencer Candron, alias Mr. Ying Lee, had to get him out.

Dr. Ch'ien was important. The government of the United States knew he was important, but they did not yet know *how* important he was.

Man had already reached the Moon and returned. The Martian expedition had landed safely, but had not yet returned. No one had heard from the Venusian expedition, and it was presumed lost. But the Moon was being jointly claimed by Russian and American suits at the United Nations, while the United Nations itself was trying to establish a claim. The Martian expedition was American, but a Russian ship was due to land in two months. The lost Venusian expedition had been Russian, and the United States was ready to send a ship there.

After nearly forty years, the Cold War was still going on, but now the scale had expanded from the global to the interplanetary.

And now, up-and-coming China, defying the Western Powers and arrogantly ignoring her Soviet allies, had decided to get into the race late and win it if she could.

And she very likely could, if she could exploit the abilities of James Ch'ien to the fullest. If Dr. Ch'ien could finish his work, travel to the stars would no longer be a wild-eyed idea; if he could finish, spatial velocities would no longer be limited to the confines of the rocket, nor even to the confines of the velocity of light. Man could go to the stars.

The United States Federal Government knew—or, at least, the most responsible officers of that government knew—that Ch'ien's equations led to interstellar travel, just as Einstein's equations had led to atomic energy. Normally, the United States would never have allowed Dr. Ch'ien to attend the International Physicists Conference in Peiping. But diplomacy has its rules, too.

Ch'ien had published his preliminary work—a series of highly abstruse and very controversial equations—back in '80. The paper had appeared in a journal that was circulated only in the United States and was not read by the majority of mathematical physicists. Like the work of Dr. Fred Hoyle, thirty years before, it had been laughed at by the majority of the men in the field. Unlike Hoyle's work, it had never received any publicity. Ch'ien's paper had remained buried.

In '81, Ch'ien had realized the im-

portance of his work, having carried it further. He had reported his findings to the proper authorities of the United States Government, and had convinced that particular branch of the government that his work had useful validity. But it was too late to cover up the hints that he had already published.

Dr. James Ch'ien was a friendly, gregarious man. He liked to go to conventions and discuss his work with his colleagues. He was, in addition, a man who would never let anything go once he had got hold of it, unless he was convinced that he was up a blind alley. And, as far as Dr. Ch'ien was concerned, that took a devil of a lot of convincing.

The United States government was, therefore, faced with a dilemma. If they let Ch'ien go to the International Conferences, there was the chance that he would be forced, in some way, to divulge secrets that were vital to the national defense of the United States. On the other hand, if they forbade him to go, the Communist governments would suspect that Ch'ien knew something important, and they would check back on his previous work and find his publications of 1980. If they did, and realized the importance of that paper, they might be able to solve the secret of the interstellar drive.

The United States government had figuratively flipped a coin, and the result was that Ch'ien was allowed to come and go as he pleased, as though he were nothing more than just another government physicist.

And now he was in the hands of China.

How much did the Chinese know? Not much, evidently; otherwise they would never have bothered to go to the trouble of kidnaping Dr. James Ch'ien and covering the kidnaping so elaborately. They *suspected,* yes; but they couldn't *know.* They knew that the earlier papers meant something, but they didn't know what—so they had abducted Ch'ien in the hope that he would tell them.

James Ch'ien had been in their hands now for two months. How much information had they extracted by now? Personally, Spencer Candron felt that they had got nothing. You can force a man to work; you can force him to tell the truth. But you can *not* force a man to create against his will.

Still, even a man's will can be broken, given enough time. If Dr. Ch'ien weren't rescued soon . . .

*Tonight,* Candron thought with determination. *I'll get Ch'ien tonight.* That was what the S.M.M.R. had sent him to do. And that's what he would—*must*—do.

Ahead of him loomed the walls of the Palace of the Great Chinese People's Government. Getting past them and into the inner court was an act that was discouraged as much as possible by the Special Police guard which had charge of those walls. They were brilliantly lighted and heavily guarded. If Candron tried to levitate himself over, he'd most likely be shot down in midair. They might be baffled afterwards, when

they tried to figure out how he had come to be flying around up there, but that wouldn't help Candron any.

Candron had a better method.

When the automobile carrying the People's Minister of Finance, the Honorable Chou Lung, went through the Gate of the Dog to enter the inner court of the Palace, none of the four men inside it had any notion that they were carrying an unwanted guest. How could they? The car was a small one; its low, streamlined body carried only four people, and there was no luggage compartment, since the powerful little vehicle was designed only for maneuvering in a crowded city or for fast, short trips to nearby towns. There was simply no room for another passenger, and both the man in the car and the guards who passed it through were so well aware of that fact that they didn't even bother to think about it. It never occurred to them that a slight, elderly-looking gentleman might be hanging beneath the car, floating a few inches off the ground, holding on with his fingertips, and allowing the car to pull him along as it moved on into the Palace of the Great Chinese People's Government.

Getting into the subterranean cell where Dr. James Ch'ien was being held was a different kind of problem. Candron knew the interior of the Palace by map only, and the map he had studied had been admittedly inadequate. It took him nearly an hour to get to the right place. Twice, he avoided a patrolling guard by taking to the air and concealing himself in the darkness of an overhead balcony. Several other times, he met men in civilian clothing walking along the narrow walks, and he merely nodded at them. He looked too old and too well-dressed to be dangerous.

The principle that made it easy was the fact that no one expects a lone man to break into a heavily guarded prison.

After he had located the building where James Ch'ien was held, he went high-flying. The building itself was one which contained the living quarters of several high-ranking officers of the People's Government. Candron knew he would be conspicuous if he tried to climb up the side of the building from the outside, but he managed to get into the second floor without being observed. Then he headed for the elevator shafts.

It took him several minutes to jimmy open the elevator door. His mind was sensitive enough to sense the nearness of others, so there was no chance of his being caught red-handed. When he got the door open, he stepped into the shaft, brought his loathing for the bottom into the fore, and floated up to the top floor. From there it was a simple matter to get to the roof, drop down the side, and enter the open window of an officer's apartment.

He entered a lighted window rather than a darkened one. He wanted to know what he was getting into. He had his gun ready, just in case,

but there was no sign of anyone in the room he entered. A quick search showed that the other two rooms were also empty. His mind had told him that there was no one awake in the apartment, but a sleeping man's mind, filled with dimmed, chaotic thoughts, blended into the background and might easily be missed.

Then Spencer Candron used the telephone, punching the first of the two code numbers he had been given. A connection was made to the room where a twenty-four-hour guard kept watch over James Ch'ien via television pickups hidden in the walls of his prison apartment in the basement.

Candron had listened to recordings of one man's voice for hours, getting the exact inflection, accent, and usage. Now, he made use of that practice.

"This is General Soong," he said sharply. "We are sending a Dr. Wan down to persuade the guest. We will want recordings of all that takes place."

"Yes, sir," said the voice at the other end.

"Dr. Wan will be there within ten minutes, so be alert."

"Yes, sir. All will be done to your satisfaction."

"Excellent," said Candron. He smiled as he hung up. Then he punched another secret number. This one connected him with the guards outside Ch'ien's apartment. As General Soong, he warned them of the coming of Dr. Wan. Then he went to the window, stepped out, and headed for the roof again.

There was no danger that the calls would be suspected. Those two phones could not be contacted except from inside the Palace, and not even then unless the number was known.

Again he dropped down Elevator Shaft Three. Only Number One was operating this late in the evening, so there was no fear of meeting it coming up. He dropped lightly to the roof of the car, where it stood empty in the basement, opened the escape hatch in the roof, dropped inside, opened the door, and emerged into the first basement. Then he started down the stairs to the subbasement.

The guards were not the least suspicious, apparently. Candron wished he were an honest-to-God telepath, so he could be absolutely sure. The officer at the end of the corridor that led to Ch'ien's apartment was a full captain, a tough-looking, swarthy Mongol with dark, hard eyes. "You are Dr. Wan?" he asked in a guttural baritone.

"I am," Candron said. This was no place for traditional politeness. "Did not General Soong call you?"

"He did, indeed, doctor. But I assumed you would be carrying—" He gestured, as though not quite sure what to say.

Candron smiled blandly. "Ah. You were expecting the little black bag, is it not so? No, my good captain; I am a psychologist, not a medical doctor."

The captain's face cleared. "So. The persuasion is to be of the more subtle type."

"Indeed. Only thus can we be assured of his co-operation. One cannot force the creative mind to create; it must be cajoled. Could one have forced the great K'ung Fu-tse to become a philosopher at the point of a sword?"

"It is so," said the captain. "Will you permit me to search you?"

The affable Dr. Wan emptied his pockets, then permitted the search. The captain casually looked at the identification in the wallet. It was, naturally, in perfect order for Dr. Wan. The identification of Ying Lee had been destroyed hours ago, since it was of no further value.

"These things must be left here until you come out, doctor," the captain said. "You may pick them up when you leave." He gestured at the pack of cigarettes. "You will be given cigarettes by the interior guard. Such are my orders."

"Very well," Candron said calmly. "And now, may I see the patient?" He had wanted to keep those ciga-

rettes. Now he would have to find a substitute.

The captain unlocked the heavy door. At the far end, two more guards sat, complacently playing cards, while a third stood at a door a few yards away. A television screen imbedded in the door was connected to an interior camera which showed the room within.

The corridor door was closed and locked behind Candron as he walked toward the three interior guards. They were three more big, tough Mongols, all wearing the insignia of lieutenants. This was not a prisoner who could be entrusted to the care of common soldiers; the secret was too important to allow the *hoi polloi* in on it. They carried no weapons; the three of them could easily take care of Ch'ien if he tried anything foolish, and besides, it kept weapons out of Ch'ien's reach. There were other methods of taking care of the prisoner if the guards were inadequate.

The two officers who were playing cards looked up, acknowledged Dr. Wan's presence, and went back to their game. The third, after glancing at the screen, opened the door to James Ch'ien's apartment. Spencer Candron stepped inside.

It was because of those few seconds—the time during which that door was open—that Candron had called the monitors who watched Ch'ien's apartment. Otherwise, he wouldn't have bothered. He needed fifteen seconds in which to act, and he couldn't do it with that door open. If the monitors had given an alarm in these critical seconds . .

But they hadn't, and they wouldn't. Not yet.

The man who was sitting in the easy-chair on the opposite side of the room looked up as Candron entered.

James Ch'ien (B.S., M.S., M.I.T., Ph. D., U.C.L.A) was a young man, barely past thirty His tanned face no longer wore the affable smile that Candron had seen in photographs, and the jet-black eyes beneath the well-formed brows were cold instead of friendly, but the intelligence behind the face still came through.

As the door was relocked behind him, Candron said, in Cantonese: "This unworthy one hopes that the excellent doctor is well. Permit me to introduce my unworthy self: I am Dr. Wan Feng."

Dr. Ch'ien put the book he was reading in his lap. He looked at the ceiling in exasperation, then back at Candron. "All right," he said in English, "so you don't believe me. But I'll repeat it again in the hope that I can get it through your skulls." It was obvious that he was addressing, not only his visitor, but anyone else who might be listening.

"I do not speak Chinese," he said, emphasizing each word separately. "I can say 'Good morning' and 'Good-by', and that's about it. I *do* wish I could say 'drop dead,' but that's a luxury I can't indulge. If you can speak English, then go ahead; if not, quit wasting my time and yours. Not," he added, "that it won't be a waste of time anyway, but at least it will relieve the monotony."

Candron knew that Ch'ien was only partially telling the truth. The physicist spoke the language badly, but he understood it fairly well.

"Sorry, doctor," Candron said in English, "I guess I forgot myself. I am Dr. Wan Feng."

Ch'ien's expression didn't change, but he waved to a nearby chair. "Sit down, Dr. Feng, and tell me what propaganda line you've come to deliver now."

Candron smiled and shook his head slowly. "That was unworthy of you, Dr. Ch'ien. Even though you have succumbed to the Western habit of putting the family name last, you are perfectly aware that 'Wan,' not 'Feng,' is my family name."

The physicist didn't turn a hair. "Force of habit, Dr. Wan. Or, rather, a little retaliation. I was called 'Dakta Chamis' for two days, and even those who could pronounce the name properly insisted on 'Dr. James.' But I forget myself. I am supposed to be the host here. Do sit down and tell me why I should give myself over to Communist China just because my grandfather was born here back in the days when China was a republic."

Spencer Candron knew that time was running out, but he had to force Ch'ien into the right position before he could act. He wished again that he had been able to keep the cigarettes. Ch'ien was a moderately heavy smoker, and one of those drugged cigarettes would have come in handy now. As it was, he had to handle it differently. And that meant a different approach.

"No, Dr. Ch'ien," he said, in a voice that was deliberately too smooth, "I will not sit down, thank you. I would prefer that you stand up."

The physicist's face became a frozen mask. "I see that the doctorate you claim is not for studies in the field of physics. You're not here to worm things out of me by discussing my work—talking shop. What is it, *Doctor* Wan?"

"I am a psychologist," Candron said. He knew that the monitors watching the screens and listening to the conversation were recording everything. He knew that they shouldn't be suspicious yet. But if the real General Soong should decide to check on what his important guest was doing—

"A psychologist," Ch'ien repeated in a monotone. "I see."

"Yes. Now, will you stand, or do I have to ask the guards to lift you to your feet?"

James Ch'ien recognized the inevitable, so he stood. But there was a wary expression in his black eyes. He was not a tall man; he stood nearly an inch shorter than Candron himself.

"You have nothing to fear, Dr. Ch'ien," Candron said smoothly. "I merely wish to test a few of your reactions. We do not wish to hurt you." He put his hands on the other man's shoulders, and positioned him. "There," he said. "Now. Look to the left."

"Hypnosis, eh?" Ch'ien said with a grim smile. "All right. Go ahead." He looked to his left.

"Not with your head," Candron said calmly. "Face me and look to the left with your eyes."

Ch'ien did so, saying: "I'm afraid you'll have to use drugs after all, Dr. Wan. I will not be hypnotized."

"I have no intention of hypnotizing you. Now look to the right."

Ch'ien obeyed.

Candron's right hand was at his side, and his left hand was toying with a button on his coat. "Now up," he said.

Dr. James Ch'ien rolled his eyeballs upward.

Candron had already taken a deep breath. Now he acted. His right hand balled into a fist and arced upwards in a crashing uppercut to Ch'ien's jaw. At almost the same time, he jerked the button off his coat, cracked it with his fingers along the special fissure line, and threw it to the floor.

As the little bomb spewed forth unbelievable amounts of ultra-finely divided carbon in a dense black cloud of smoke, Candron threw both arms around the collapsing physicist, ignoring the pain in the knuckles of his right hand. The smoke cloud billowed around them, darkening the room and obscuring the view from the monitor screens that were watching them. Candron knew that the guards were acting now; he knew that the big Mongols outside were already inserting the key in the door and inserting their nose plugs; he knew that the men in the monitor room had hit an alarm button and had already begun to flood the room with sleep gas. But he paid no attention to these things.

Instead, he became homesick.

Home. It was a little place he knew and loved. He could no longer stand the alien environment around him; it was repugnant, repelling. All he could think of was a little room, a familiar room, a beloved room. He knew the cracks in its ceiling, the feel of the varnish on the homely little desk, the touch of the worn carpet against his feet, the very smell of the air itself. And he loved them and longed for them with all the emotional power that was in him.

And suddenly the darkness of the smoke-filled prison apartment was gone.

Spencer Candron stood in the middle of the little hotel room he had rented early that morning. In his arms, he held the unconscious figure of Dr. James Ch'ien.

He gasped for breath, then, with an effort, he stooped, allowed the limp body of the physicist to collapse over his shoulder, and stood straight again, carrying the man like a sack of potatoes. He went to the door of the room and opened it carefully. The hall was empty. Quickly, he moved outside, closing the door behind him, and headed toward the stair. This time, he dared not trust the elevator shaft. The hotel only boasted one elevator, and it might be used at any time. Instead, he allowed his dislike for the stair treads

to adjust his weight to a few pounds, and then ran up them two at a time.

On the roof of the hotel, he adjusted his emotional state once more, and he and his sleeping burden drifted off into the night, toward the sea.

No mind is infinitely flexible, infinitely malleable, infinitely capable of taking punishment, just as no material substance, however constructed, is capable of absorbing the energies brought to bear against it indefinitely.

A man can hate with a virulent hatred, but unless time is allowed to dull and soothe that hatred, the mind holding it will become corroded and cease to function properly, just as a machine of the finest steel will become corroded and begin to fail if it is drenched with acid or exposed to the violence of an oxidizing atmosphere.

The human mind can insulate itself, for a time, against the destructive effects of any emotion, be it hatred, greed, despondency, contentment, happiness, pleasure, anger, fear, lust, boredom, euphoria, determination, or any other of the myriads of "ills" that man's mind—and thus his flesh—is heir to. As long as a mind is capable of changing from one to another, to rotate its crops, so to speak, the insulation will remain effective, and the mind will remain undamaged. But any single emotional element, held for too long, will break down the resistance of the natural insulation and begin to damage the mind.

Even that least virulent of emotions, love, can destroy. The hot, passionate love between new lovers must be modified or it will kill. Only when its many facets can be shifted around, now one and now the other coming into play, can love be endured for any great length of time.

Possibly the greatest difference between the sane and the unsane is that the sane know when to release a destructive force before it does more than minimal damage; to modify or eliminate an emotional condition before it becomes a deadly compulsion; to replace one set of concepts with another when it becomes necessary to do so; to recognize that point when the mind must change its outlook or die. To stop the erosion, in other words, before it becomes so great that it cannot be repaired.

For the human mind cannot contain any emotion, no matter how weak or how fleeting, without change. And the point at which that change ceases to be *con*structive and becomes, instead, *de*structive—*that* is the ultimate point beyond which no human mind can go without forcing a change—*any* change—in itself.

Spencer Candron knew that. To overuse the psionic powers of the human mind is as dangerous as overusing morphine or alcohol. There are limits to mental powers, even as there are limits to physical powers.

*Psychokinesis* is defined as the ability of a human mind to move, no

matter how slightly, a physical object by means of psionic application alone. In theory, then, one could move planets, stars, even whole galaxies by thought alone. But, in physical terms, the limit is easily seen. Physically, it would be theoretically possible to destroy the sun if one had enough atomic energy available, but that would require the energy of another sun—or more. And, at that point, the Law of Diminishing Returns comes into operation. If you don't want a bomb to explode, but the only way to destroy that bomb is by blowing it up with another bomb of equal power, where is the gain?

And if the total mental power required to move a planet is greater than any single human mind can endure—or even greater than the total mental endurance of a thousand planetsfull of minds, is there any gain?

There is not, and can never be, a system without limits, and the human mind is a system which obeys that law.

None the less, Spencer Candron kept his mind on flight, on repulsion, on movement, as long as he could. He was perfectly willing to destroy his own mind for a purpose, but he had no intention of destroying it uselessly. He didn't know how long he kept moving eastward; he had no way of knowing how much distance he had covered nor how long it had taken him. But, somewhere out over the smoothly undulating surface of the Pacific, he realized that he was approaching his limit. And, a few seconds later, he detected the presence of men beneath the sea.

He knew they were due to rise an hour before dawn, but he had no idea how long that would be. He had lost all track of time. He had been keeping his mind on controlling his altitude and motion, and, at the same time, been careful to see whether Dr. Ch'ien came out of his unconscious state. Twice more he had had to strike the physicist to keep him out cold, and he didn't want to do it again.

So, when he sensed the presence of the American submarine beneath the waves, he sank gratefully into the water, changing the erosive power of the emotion that had carried him so far, and relaxing into the simple physical routine of keeping both himself and Ch'ien afloat.

By the time the submarine surfaced a dozen yards away, Spencer Candron was both physically and mentally exhausted. He yelled at the top of his lungs, and then held on to consciousness just long enough to be rescued.

"The official story," said Senator Kerotski, "is that an impostor had taken Dr. Ch'ien's place before he ever left the United States—" He grinned. "At least, the substitution took place before the delegates reached China. So the 'assassination' was really no assassination at all. Ch'ien was kidnaped here, and a double put in his place in Peiping. That absolves both us and the Chinese Government of any complicity. We save face for

them, and they save face for us. Since he turned up here, in the States, it's obvious that he couldn't have been in China." He chuckled, but there was no mirth in it. "So the cold war still continues. We know what they did, and—in a way—they know what we did. But not how we did it."

The senator looked at the other two men who were with him on the fifth floor office of the *Society for Mystical and Metaphysical Research.* Taggert was relaxing on his couch, and Spencer Candron, just out of the hospital, looked rather palè as he sat in the big, soft chair that Taggert had provided.

The senator looked at Candron. "The thing I don't understand is, why was it necessary to knock out Ch'ien? He'll have a sore jaw for weeks. Why didn't you just tell him who you were and what you were up to?"

Candron glanced at Taggert, but Taggert just grinned and nodded.

"We couldn't allow that," said Candron, looking at Senator Kerotski. "Dr. James Ch'ien has too much of a logical, scientific mind for that. We'd have ruined him if he'd seen me in action."

The senator looked a little surprised. "Why? We've convinced other scientists that they were mistaken in their observations. Why not Ch'ien?"

"Ch'ien is too good a scientist," Candron said. "He's not the type who would refuse to believe something he saw simply because it didn't agree with his theories. Ch'ien is one of those dangerous in-betweens. He's too brilliant to be allowed to go to waste, and, at the same time, too rigid to change his manner of thinking. If he had seen me teleport or levitate, he wouldn't reject it—he'd try to explain it. And that would have effectively ruined him."

"Ruined him?" The senator looked a little puzzled.

Taggert raised his heavy head from the couch. "Sure, Leo," he said to the senator. "Don't you see? We *need* Ch'ien on this interstellar project. He absolutely *must* dope out the answer somehow, and no one else can do it as quickly."

"With the previous information," the senator said, "we would have been able to continue."

"Yeah?" Taggert said, sitting up. "Has anyone been able to dope out Fermat's Last Theorem without Fermat? No. So why ruin Ch'ien?"

"It would ruin him," Candron broke in, before the senator could speak. "If he saw, beyond any shadow of a doubt, that levitation and teleportation were possible, he would have accepted his own senses as usable data on definite phenomena. But, limited as he is by his scientific outlook, he would have tried to evolve a scientific theory to explain what he saw. What else could a scientist *do?*"

Senator Kerotski nodded, and his nod said: "I see. He would have diverted his attention from the field of the interstellar drive to the field of psionics. And he would have wasted years trying to explain an in-

herently nonlogical area of knowledge by logical means."

"That's right," Candron said. "We would have set him off on a wild goose chase, trying to solve the problems of psionics by the scientific, the logical, method. We would have presented him with an unsolvable problem."

Taggert patted his knees. "We would have given him a problem that he could not solve with the methodology at hand. It would be as though we had proved to an ancient Greek philosopher that the cube *could* be doubled, and then allowed him to waste his life trying to do it with a straight-edge and compass."

"We know Ch'ien's psychological pattern," Candron continued. "He's not capable of admitting that there is any other thought pattern than the logical. He would try to solve the problems of psionics by logical methods, and would waste the rest of his life trying to do the impossible."

The senator stroked his chin. "That's clear," he said at last. "Well, it was worth a cracked jaw to save him. We've given him a perfectly logical explanation of his rescue, and, simultaneously, we've put the Chinese government into absolute confusion. They have no idea of how you got out of there, Candron."

"That's not as important as saving Ch'ien," Candron said.

"No," the senator said quickly, "of course not. After all, the Secretary of Research needs Dr. Ch'ien—the man's important."

Spencer Candron smiled. "I agree. He's practically indispensable—as much as a man can be."

"He's the Secretary's right hand man," said Taggert firmly.

THE END

# THE ANALYTICAL LABORATORY

November 1959 Issue.

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THE EDITOR.

# SUMMIT

*Almost anything, if it goes on long enough, can be reduced to, first a Routine, and then, to a Tradition. And at the point it is, obviously, Necessary.*

## By MACK REYNOLDS

Illustrated by Freas

WO king-sized bands blared martial music, the *"Internationale"* and the "Star-Spangled Banner," each seemingly trying to drown the other in a *Götterdämmerung* of acoustics.

Two lines of troops, surfacely differing in uniforms and in weapons, but basically so very the same, so evenly matched, came to attention. A thousand hands slapped a thousand submachine gun stocks.

Marshal Vladimir Ignatov strode stiff-kneed down the long march, the stride of a man for years used to cavalry boots. He was flanked by frozen visaged subordinates, but none so cold of face as he himself.

At the entrance to the conference hall he stopped, turned and waited.

At the end of the corridor of troops a car stopped and several figures emerged, most of them in civilian dress, several bearing brief cases. They in their turn ran the gantlet.

At their fore walked James Warren Donlevy, spritely, his eyes darting here, there, politician-like. A half smile on his face, as though afraid he might forget to greet a voter he knew, or was supposed to know.

His hand was out before that of Vladimir Ignatov's.

"Your Excellency," he said.

Ignatov shook hands stiffly. Dropped that of the other's as soon as protocol would permit.

The field marshal indicated the door of the conference hall. "There is little reason to waste time, Mr. President."

"Exactly," Donlevy snapped.

The door closed behind them and the two men, one uniformed and bemedaled, the other nattily attired in his business suit, turned to each other.

"Nice to see you again, Vovo. How're Olga and the baby?"

The soldier grinned back in response. "Two babies now—you don't keep up on the *real* news, Jim. How's Martha?" They shook hands.

"Not so good," Jim said, scowling. "I'm worried. It's that new cancer. As soon as we conquer one type two more rear up. How are you people doing on cancer research?"

Vovo was stripping off his tunic. He hung it over the back of one of the chairs, began to unbutton his high, tight military collar. "I'm not really up on it, Jim, but I think that's one field where you can trust anything we know to be in the regular scientific journals our people exchange with yours. I'll make some inquiries when I get back home, though. You never know, this new strain—I guess you'd call it—might be one that we're up on and you aren't."

"Yeah," Jim said. "Thanks a lot." He crossed to the small portable bar. "How about a drink? Whisky, vodka, rum—there's ice."

Vovo slumped into one of the heavy chairs that were arranged around the table. He grimaced, "No vodka, I don't feel patriotic today.

How about one of those long cold drinks, with the cola stuff?"

"Cuba libra," Jim said. "Coming up. Look, would you rather speak Russian?"

"No," Vovo said, "my English is getting rusty. I need the practice."

Jim brought the glasses over and put them on the table. He began stripping off his own coat, loosening his tie. "God, I'm tired," he said. "This sort of thing wears me down."

Vovo sipped his drink. "Now there's as good a thing to discuss as any, in the way of killing time. The truth now, Jim, do you really believe in a God? After all that's happened to this human race of ours, do you really believe in divine guidance?" He twisted his mouth sarcastically.

The other relaxed. "I don't know," he said. "I suppose so. I was raised in a family that believed in God. Just as, I suppose, you were raised in one that didn't." He lifted his shoulders slightly in a shrug. "Neither of us seems to be particularly brilliant in establishing a position of our own."

Vovo snorted. "Never thought of it that way," he admitted. "We're usually contemptuous of anyone still holding to the old beliefs. There aren't many left."

"More than you people admit, I understand."

Vovo shook his heavy head. "No, not really. Mostly crackpots. Have you ever noticed how it is that the nonconformists in any society are usually crackpots? The people on your side that admit belonging to our organizations, are usually on the wild eyed an uncombed hair side—I admit it. On the other hand, the people in our citizenry who subscribe to your system, your religion, that sort of thing, are crackpots, too. Applies to religion as well as politics. An atheist in your country is a nonconformist—in mine, a Christian is. Both crackpots."

Jim laughed and took a sip of his drink.

Vovo yawned and said, "How long are we going to be in here?"

"I don't know. Up to us, I suppose."

"Yes. How about another drink? I'll make it. How much of that cola stuff do you put in?"

Jim told him, and while the other was on his feet mixing the drinks, said, "You figure on sticking to the same line this year?"

"Have to," Vovo said over his shoulder. "What's the alternative?"

"I don't know. We're building up to a whale of a depression as it is, even with half the economy running full blast producing defense materials."

Vovo chuckled, "Defense materials. I wonder if ever in the history of the human race anyone ever admitted to producing *offense* materials."

"Well, you call it the same thing. All your military equipment is for defense. And, of course, according to your press, all ours is for offense."

"Of course," Vovo said.

He brought the glasses back and handed one to the other. He slumped back into his chair again, loosened two buttons of his trousers.

"Jim," Vovo said, "why don't you divert more of your economy to public works, better roads, reforestration, dams—that sort of thing."

Jim said wearily, "You're a better economist than that. Didn't your boy Marx, or was it Engels, write a small book on the subject? We're already overproducing — turning out more products than we can sell."

"I wasn't talking about your government building new steel mills. But dams, roads, that sort of thing. You could plow billions into such items and get some real use out of them. We both know that our weapons will never be used—they can't be."

Jim ticked them off on his fingers. "We already are producing more farm products than we know what to do with; if we build more dams it'll open up new farm lands and increase the glut. If we build more and better roads, it will improve transportation, which will mean fewer men will be able to move greater tonnage—and throw transportation employees into the unemployed. If we go all out for reforestration, it will eventually bring down the price of lumber and the lumber people are howling already. No," he shook his head, "there's just one really foolproof way of disposing of surpluses and using up labor power and that's war—hot or cold."

Vovo shrugged, "I suppose so."

"It amounts to building pyramids, of course." Jim twisted his mouth sourly. "And since we're asking questions about each other's way of life, when is your State going to begin to *wither away?*"

"How was that?" Vovo asked.

"According to your sainted founder, once you people came to power the State was going to wither away, class rule would be over, and Utopia be on hand. That was a long time ago, and your State is stronger than ours."

Vovo snorted. "How can we wither away the State as long as we are threatened by capitalist aggression?"

Jim said, "Ha!"

Vovo went on. "You know better than that, Jim. The only way my organization can keep in power is by continually beating the drums, keeping our people stirred up to greater and greater sacrifices by using you as a threat. Didn't the old Romans have some sort of maxim to the effect that when you're threatened with unease at home stir up trouble abroad?"

"You're being even more frank than usual," Jim said. "But that's one of the pleasures of these get-togethers, neither of us resorts to hypocrisy. But you can't keep up these tensions forever."

"You mean *we* can't keep up these tensions forever, Jim. And when they end? Well, personally I can't see my organization going out without a blood bath." He grimaced sourly, "And since I'd probably be one of the first to be bathed, I'd like to postpone the time. It's like having a tiger by the tail, Jim. We can't let go."

"Happily, I don't feel in the same spot," Jim said. He got up and went to the picture window that took up one entire wall. It faced out over a mountain vista. He looked soberly into the sky.

Vovo joined him, glass in hand.

"Possibly your position isn't exactly the same as ours but there'd be some awfully great changes if that military based economy of yours suddenly had peace thrust upon it. You'd have a depression such as you've never dreamed of. Let's face reality, Jim, neither of us can afford peace."

"Well, we've both known that for a long time."

They both considered somberly, the planet Earth blazing away, a small sun there in the sky.

Jim said, "I sometimes think that the race would have been better off, when man was colonizing Venus and Mars, if it had been a joint enterprise rather than you people doing one, and we the other. If it had all been in the hands of that organization . . ."

"The United Nations?" Vovo supplied.

". . . Then when Bomb Day hit, perhaps these new worlds could have gone on to, well, better things."

"Perhaps," Vovo shrugged. "I've often wondered how Bomb Day started. Who struck the spark."

"Happily there were enough colonists on both planets to start the race all over again," Jim said. "What difference does it make, who struck the spark?"

"None," I suppose. Vovo began to button his collar, readjust his clothes. "Well, shall we emerge and let the quaking multitudes know that once again we have made a shaky agreement? One that will last until the next summit meeting."

THE END

# IN TIMES TO COME

The change-over from Astounding Science Fiction to ANALOG: Science Fact & Fiction will continue next month. Over the course of 1960, Astounding will fade, and ANALOG grow.

I've already received a number of comments, ranging from howls of anger to gentle wails. To date, no compliments on the change.

Look, friends—this is a heck of a field in which to find adoration of a Tradition! "Astounding" has been an unhelpful title since the year 1937. I've been trying to change it, get rid of it, since I first came to this magazine —and that was over twenty-two years ago. Soon after I arrived, I changed from "Astounding Stories" to "Astounding Science Fiction"; the intent, then, was to make it "Science Fiction"—and I was blocked, because another magazine started with that title before I could make the change.

Now you know, and I know, what "Astounding" means when coupled to "Science Fiction" . . . but it's kind of like the story about the barking dog that won't bite. You know and I know . . . but does *he* know? So *we* know what "Astounding means" . . . but the dictionary doesn't. And most people

(*Continued on page* 53)

# DUE..

***Hertzog was an efficient operator. He didn't mind an efficient crook, really—it was the stupidity of greediness that annoyed him...***

RANK HERTZOG of International Tours, Incorporated, scratched himself behind one disproportionately large ear and lifted one shaggy eyebrow. He sat turned sideways to his desk, with his feet up on an extended drawer. His visitor sat stiffly in a chair placed at the opposite corner of the desk, so that Hertzog's glance shot diagonally toward his visitor and, at his convenience, over the visitor's shoulder at the ocean horizon far away and far below.

Hertzog nibbled jerkily at his upper lip. "Now, let me just get this clear in my own mind," he said to the prim little man in the other chair. "You want cash in advance?"

"No later than July 14th midnight," the prim man affirmed. "It's very important that the money should have reached our office in Basle by that time." The little man sat with his thighs and knees pressed together, his back upright and his arms at his sides, with his hands clasped in his lap. He wore a black suit and a white shirt with a black string tie. He had a pale, boney face, and gray-black hair which had been clipped close at the sides and brushed flat on the top of his head with a white part straight down the middle. Motionless beads of perspiration covered his forehead.

"And as soon as the money is in your office, you'll have our order loaded on the first tube train out."

"That is correct," the prim little man said. He was a liquor salesman. "I must remind you that today is July 1st."

"Well, now," Frank Hertzog complained, "that seems like an awfully funny way to do business, all of a sudden. We've been good customers of yours for years. No ITI cruise ship serves anything but your brands."

"Naturally," the little salesman said. "Our brands are the best in the world."

"So's ITI's credit rating. I don't understand this, Mr. Keller, I really don't. The account's been settled every month. It almost sounds as if you don't want our business. There *are* other wholesalers in this world, you know."

# PROCESS

## By ALGIS BUDRYS

**Illustrated by Bernklau**

Mr. Keller gestured nervously. "Please, Mr. Hertzog. None of our competitors are organized to give you service equal to ours."

"Up to now they haven't been, you mean. But you're forcing me to wonder whether a little less service and a great deal more courtesy wouldn't be worth it."

"Mr. Hertzog, I—" The little salesman suddenly leaned forward urgently. "It may cost me my job to speak frankly to you, Mr. Hertzog. You understand."

Hertzog leaned back and looked narrowly at Keller. "I'm not sure I do, Mr. Keller. You and my company have been dealing with each other for some time. In cases where a salesman has been handling the same account for years, it becomes a moot point whether he represents his employer or his account. A tacit arrangement of mutual advantage between salesman and account gradually evolves into being. This is a fact as old as salesmanship. I'm a little bit surprised at your reluctance to comply with business ethics, Mr. Keller. I really am. I wish you would say whatever is on your mind. I can't say I care for your implication that anything you tell me in confidence might pass beyond this room."

Keller's pale lips trembled at their corners. "Mr. Hertzog, you put me in a difficult position. You're clearly in the right, and yet—"

"If I'm in the right, Mr. Keller, then let's have it. What's going on?"

The little man sighed. "Very well, Mr. Hertzog." His voice fell, and he leaned forward to compensate for it, his eyes unconsciously darting about the room before he went on. "You know there's been a change in the top management of my company? What has occurred is that the new directors are much more favorably inclined toward Capetown than toward Atlantis."

"That's ridiculous!" Hertzog snapped. "Atlantis is the logical port facility for Europe. It's true that transshipping goods into the tube train terminal here and running them through the tunnel under the Bay of Biscay and the contaminated coastline does add an expense. But shipping overland across Africa from Capetown is even more costly."

Keller spread his hand placatingly. "Please, Mr. Hertzog. You know this, and I know this. In time, even my directors will know this. But at the moment they have been beguiled by this new notion of zeppelin freighters. They have been shown plans for lighter-than-air craft with cargo capacities comparable to those of a steamship, and they have attended test flight demonstrations. They are impressed by the majesty of these huge constructions — you understand, Mr. Hertzog, they are like children. They will grow up, but meanwhile—" Keller shook his head.

"Let them try zeppelin lighterage from Capetown to Europe across the African interior. One or two line squalls will grow 'em up fast. Insurance rates are a great urge toward maturity," Hertzog growled.

"Exactly. Exactly," Keller agreed. "But in the meantime they are convinced that Capetown will become the great cosmopolitan center of the Eastern Hemisphere, and that Atlantis will wither, out here on the ocean with nothing to sustain it. So they have instituted strict new policies. Please, Mr. Hertzog — one or two demonstrations of prompt, ready cash payment on your part, and they will think again. I realize it is an imposition on your self-esteem, but a truly great man can afford to be above such things." His voice became a conspiratorial whisper. "After all, Mr. Hertzog, once the Capetown bubble has burst, you'll be in a position to demand unheard-of discounts—"

"Yes," Hertzog said. "Yes, I see." He stood up and strolled aimlessly about the office, his hands clasped behind his back. He stared out through the window without focusing his eyes, and wrinkled his nose, eventually coming to a halt beside the settee where Keller had left his brief case. "All right, Mr. Keller, I'll have a bonded messenger at your Basle office by July 14th midnight," he said. He fumbled with the handle of Keller's brief case, swinging his hand absently backward and forward. Keller took it from him with a touch of asperity.

"Thank you very much, Mr. Hertzog. I was sure you would understand the situation."

"Yes," Hertzog said vaguely. "Yes," he repeated, watching the salesman leave.

Hertzog pressed Hoke Bannister's call stud on his desk, then walked back to the glass wall of his office and looked out. The stacked tiers of Atlantis rose up out of the ocean all around him, the water swelling around the massive concrete pilings on which they rested. It was a stormy day. The water was green and white under a gray sky, and rain swept in an exhilarating sheet across the invisible glass. Inside a two-mile perimeter, the water was calm. At the perimeter, where sonic turbulence broke up the wave action, leaping towers of foam clashed together and surrounded Atlantis in a rampart of froth. Frank Hertzog was smiling fondly through the glass when Hoke Bannister let himself in.

"Yeah?" he said, rummaging through the liquor cabinet. He was an ugly, wide man who had recently acquired the habit of five-dollar Havana cigars. His mouth was broad enough so that he could keep one between his teeth at nearly all times and still talk and drink.

"What would you do for thirty thousand dollars, Hoke?" Hertzog asked him, returning to his desk.

"Thirty thousand dollars? You mean, what kind of rules would I break? Few. Thirty thousand dollars keep a man comfortable all his life, if he plays it careful, but no kicks, you know? You don't take chances with that little bit of capital."

"What would you do for the standard salesman's commission on a thirty-thousand-dollar order?"

"You mean Keller?" Bannister finished putting his drink together and

closed up the cabinet. "I was right, sending him up here, yeah?"

"Yeah," Hertzog said, looking down at the buttons on his desk. "Yeah."

Bannister took a gulp of his drink. He stared at it, snatched open the liquor cabinet, and held up the crystal whisky decanter he'd used. "What in blazes have you fed me?" he choked.

Hertzog looked up. "I wanted you to try some of that. There's a local chemical outfit that's been trying to make scotch out of plankton."

"Frank, don't turn Keller's outfit loose yet," Bannister said.

"No," Hertzog said, "no, I'm not going to." He pushed a button. "Paulette," he said. "Got that stuff for me?"

"Yes, Frank. Coming up." A slot clicked back on Hertzog's desk, and a clipped sheaf of photostats slid up to fall flat on the desk. "I've put what I think is the relevant copy on top," Paulette's efficient voice said out of the air. Hertzog frowned down at the photostats. "Yes. I see you have. Thank you. And get hold of Thad Traven, will you, in the City Council building? That's right—he's the clerk. Make me a cocktail date for this afternoon. One of those plush and ebony places in Pleasure House ought to be just right, I think."

Thad Traven was thin and dark, with a mouth that over the years had been compressed within its original dimensions, so that after his lips folded under out of sight there was still a slit in his jaw for a half inch on either side.

"I can tell you're a steady man, Thad," Frank Hertzog said to him. "A planner. A man who weighs all the possibilities before he moves."

"No one's ever caught me looking foolish," Traven agreed. He sipped his sherry Martini and let his glance run over the faded tattoo of a mermaid on Hertzog's bare forearm.

"Yeah, well, I'm just a sort of Johnny-come-lately, you might say," Hertzog said apologetically. "When you come right down to it, all I am is a seaman roustabout whose father happened to leave him a travel agency. Oh," he said, cutting off any protest by Traven, "I've been lucky and managed to build up the business, and all that. Got a few dollars in my pocket. You know. But I'm really just a guy who hasn't got the sense not to whack off on foolish chances. Every once in a long while, a gamble like that will pay off for somebody. I've been lucky, like I say. When I need to know something—I mean, when it's something that takes a sophisticated man with a trained mind, why, I've got to come to a man like yourself for help."

Traven smiled. "You're more flattering than I perhaps deserve."

"No, no, I mean it, Thad. For instance, a man like me, that runs a travel agency, is naturally interested in other places in the world besides Atlantis. Sometimes it seems to me that it wouldn't be a bad idea to develop some interests in Europe or Africa — Sevastopol, say, or Cape-

town. I mean, besides opening branch offices. Take a real hand in local business. But if I had just gone ahead and done that, I would have found myself in real trouble with the civic government, here, because I didn't understand it was better to keep our hands off the Mainland. Whereas, if I'd come to you, I'm sure you would have been glad to explain it to me."

"Of course, Frank. The prime tenet of the Conservative party is that, here in our isolation from the Mainland, we are in an ideal position to avoid their difficulties. As long as our only real link to them is the freight tube, we stand in the position of acting as their clearing house. If we actively participate in their affairs, then we may well become embroiled in their attempts to deal with the results of the devastation. As long as we remain aloof, we are in the position of collecting our handling charges and letting it go at that. Involvement with the Mainland may easily entail added responsibilities for which we have no desire."

"Now," Hertzog explained eagerly, "I can see that, once it's been explained to me. Before, I thought that, inasmuch as we're descended from people who pushed the tube through from the Mainland and built this place, we were still somehow bound to those countries."

Traven smiled. "It's been a hundred years, Frank. None of the original sponsoring governments are still in existence. There is no legal basis for any such notion."

"No, I can see that, now, listening to you. But I needed to have it clarified."

Traven took a meditative sip of his drink. "Well, now," he said deprecatingly, "you didn't do so badly in that affair with William Waring. If he had been permitted to organize his investment syndicate, the weight of that much capitalization would have swung the civic elections to a slate of candidates pledged toward intervention in mainland affairs. You saved a great deal for many people in addition to yourself, there."

"Oh, well, he was all mixed up with a try at defrauding ITI of twenty thousand dollars. That's a lot of money. I was pretty surprised when I knocked him over and found out there was more to it than that. Just some more luck, Thad. But, you know, that was what got me thinking."

"Oh?"

"Yes, well I've been thinking that there Waring was setting up this business, which could have broken me, and I didn't have the faintest idea of it. If I'd had somebody who could tell me what was going on in civic politics, I wouldn't have been in the dark." He finished his drink and pointed to Traven's glass. "Have another?"

"Why, yes ,thank you," Traven said carefully.

Hertzog signaled to the watchful waiter, and went on. "The elections run off next week, don't they?"

"As a matter of fact, they do—the first Tuesday after the Fourth of July.

But they'll be pretty much a formality, this year. All the Mainland Interventionists withdrew after Waring was exposed. Not all of them were his candidates, of course, but even the legitimate ones were tarred with his brush."

"Uh-huh. Let's see, now . . . I'm not up to this stuff, like I said . . . you're on the Conservative ticket this year as usual, aren't you?"

Traven's lips closed entirely. "Yes, I am. I'll be the candidate for City Clerk, as usual."

"Excuse me, Thad, but that's not too far up the totem pole, is it?"

"No, it isn't," Traven said shortly.

"It seems a shame. I don't know Mayor Phillips to speak to, but it doesn't seem to me he's such an all-around hotshot."

"He is at party politicking," Traven said bitterly. "The rest of us have to settle for what's doled out to us."

"Hm-m-m. Seems like a funny way to run things. Doesn't seem fair to me."

"It isn't. But what can you expect? Atlantis is populated by people who don't have to work very hard for their money, or even think too deeply about anything. Hardly twenty per cent of them even bother to vote, and most of those are brought in by Phillip's organization. Of course, I can hardly complain about that. But, still—"

"Seems to me you *can* complain. If you don't go along with Phillips, you haven't got a chance—as long as the vote stays low."

"But who has the resources to set up a rival organization? It takes money—money for air time, money for advertising, for posters, for rallies. Who has that sort of money?"

"Well, now," Hertzog said, twisting his glass lazily in his fingers and looking at it thoughtfully.

"Good Heavens, Frank! You don't know what you're saying! And in any case, it's too late this year—"

"For a write-in candidate?"

"Write-in? No— But the campaigning, man! There's barely a week left!"

"Well, you know, Thad, ITI owns the water taxis, one of the helicopter services, and four of the hotels. We buy half the air time. We take a standard full page ad in all three newspapers every day. On TV, we've got the Sonny Weams show, 'Cactus and Hashknife Al,' 'Are You Smarter Than Your Wife?' and the Williamton Sandberg Mills news-in-depth program. How would it be if you campaigned for mayor on something like, say, the Progressive Reform ticket, with a big get-out-the-vote push and posters staring everybody in the face every time he got into a boat or hailed a 'copter? Think you could stir out, say, forty, forty-five per cent of the vote?"

Traven was pale. "Great Heavens, Frank, that's not legal! A corporation can't throw its treasury behind a candidate like that. And what would your Board of Directors say?"

"Comes to that, Thad, I'm the Board of Directors."

"But still you can't—"

"Not even if I run for dogcatcher in agate type at the bottom of each ad? I want to be dogcatcher, Thad. I have a burning passion to become dogcatcher. I'm going to campaign like crazy. But I need somebody to head the ticket. How's about it?"

"Frank, I . . . do you mean this?"

Hertzog dipped two fingers into the breast pocket of his sport shirt, took out two crumpled five-dollar bills and a slip of paper. He opened the paper and dropped it on the tablecloth in front of Traven. It was a certified ITI check for two hundred thousand dollars, made out to the Progressive Reform Party Campaign Fund.

"Of course," Hertzog said, "we're going to need a campaign issue. How about this? Phillips and the Conservative Party are alienating business interests on the Mainland which are getting annoyed at our aloofness—and our handling charges. We're losing business. Show 'em the figures—we're handling all the perishables, but the hard goods are being shipped by slow freight into Archangelsk and railroaded overland down to the Black Sea. And someday they'll put a north-south railroad across Africa. Yes, through the jungle, if we press 'em enough. Guarantee the populace a shorter work day and lower real estate taxes, if negotiations show we can increase our yearly gross by shading the handling charges a fraction."

Traven hesitated thoughtfully. "I'm not sure that jibes with my earlier public pronouncements."

"Yours? Mayor Phillips', you mean. You're coming out in the open, now. Swinging with both fists. Blowing the lid off. You're not one of Waring's gangsters—you're a respectable ex-Conservative who's had enough."

"Hm-m-m. Hm-m-m. Traven smiled broadly. "I believe I can do it. Yes, it might be just the right kind of ammunition."

"Yes, it might. Well, Thad, you're the experienced man, so I'll leave it to you to set up the campaign headquarters and hire the public relations people. I'm sending a young fellow from my office—Bannister's his name—to just lend a strong back and maintain a liaison with the ITI treasury, in case you run short—but I'll keep my fumble fingers out of this. Good luck."

Traven picked up the check, studied it fascinatedly for a moment, and put it in his billfold. "Er . . . thank you, Frank."

"Think nothing of it, Thad," Hertzog said, standing up. He left the two five dollar bills on the table and motioned to the waiter. "I'll see you at the polls," he said to Traven.

"Ah . . . Frank . . . suppose Phillips challenges me on my assertions?"

"Well, if it worries you, they're perfectly safe. Matter of public record. Study the Standard & Poore and the Dun & Bradstreet reports for the last thirty years. It's all in there." He waved a hand in farewell and left the cocktail lounge.

Frank Hertzog lived in a blister apartment, two rooms anchored to

the side of one of the ITI building's pylons, four hundred feet below sea level. It was quiet down there, and hard to get to. He stood in his kitchenette, carefully heating a pan of cocoa until it was just warmed. He poured the cocoa into a stone mug with half an inch of scotch in its bottom and went out into his living room, biting the corner out of a bacon, lettuce, and tomato sandwich spread with mustard. "How'd it go today?" he said to Hoke Bannister, who was standing in the middle of the rug and trying his hand with the dart board.

"Well, ol' Thad Traven's got the Conservatives in a fit, and the city in an uproar. Can't turn around without being hit by a Traven ad. Sonny Weams is telling jokes on Phillips, 'Are You Smarter Than Your Wife?' is full of questions about freight tonnages, and Hashknife Al is racing Cactus in the Dakota land rush."

"The Dakota land rush!" Hertzog shook his head. "Those were the days, Hoke! When a man wanted to travel somewhere, he climbed on his trusty old paint and hunkered off into the sunset. That reminds me—sign this, will you?" He pulled a wrinkled sheaf of paper out of his hip pocket and handed it over.

"What is it?" Bannister asked.

"A messenger bond. An officer of the company has to sign it."

"Why can't you?"

"I'm the messenger. I'm leaving for Basle in twenty minutes with thirty thousand dollars. It's a little before Keller's deadline, but I imagine they won't mind getting it a few days ahead of time."

Bannister scrawled his name in the space indicated and put the bond away. "Got a plane waiting?"

"No. You don't get any sensation of travel, going that fast. I've got a few hours' time. I'm going to take the tube."

"Don't forget to come back before the polls close tomorrow. Every vote counts, you know."

"Yes. *What* am I running for?"

"District assemblyman. That's almost as good as dogcatcher."

"I was afraid of that." He picked up his overnight bag and pushed the buzzer for the pylon elevator, which hissed to a stop and appeared behind a sliding door in the living room wall. "Mind the store," he said.

"Woof," Bannister answered.

The tube terminal was a hundred yards square and a hundred feet high, with two circular doors, massive, twenty yards in diameter, dripping with condensation across their bolt-studded faces, side by side like a pair of shut eyes in the far wall. Two railed cradles rested on girdered feet, extending the tubes' profile into the vault, and threw their complex shadows upon the worn concrete flooring, where the maintenance crew swarmed. There was a passenger platform built out from the wall, its forward edge curved in and under to fit flush against the nearside cradle. Hertzog waited patiently, along with a small group of other people carrying suitcases.

In the cradle, the train was being made up. It consisted of three cars, two of them freight capsules and the third with a skimpy passenger compartment at one end, and at the moment all the freight holds were open, clamshell doors ajar like rudimentary wings held aloft down the train's length. Loading cranes dropped down from the roof, lowering pre-packaged bundles of freight into calculated spaces in the holds, so that the interior of the train gradually built up into a solid mass much like one of those key-chain puzzles in which odd-shaped pieces of plastic interlock to form pistols, airplanes, and other charms. Shaped like a chrysalis jointed at two points, the train lay waiting to slide into the air lock, blind except for the three grimy portholes of the passenger compartment. The chamber echoed to every dropped tool and every scramble of a maintenance man's shoes up or down the cradle's latticework. The crane cables whined through their sheaves, and the stevedores bellowed at each other over the racket.

Each of the cranes seemed to bring

down its last load at the same moment. A siren wound its way up to maximum audible pitch, and the clamshell doors first banged themselves shut and then pulled their retracting arms in after them. The passenger door spat open, and Hertzog boarded with his fellow passengers. As soon as the last of them was inside, the door thudded home. They found seats and the train started without preamble, inching laboriously through the raised air lock hatch.

The hatch closed behind them, and they waited in darkness. The pumps evacuated the lock, and then the tubeway door dilated, the sound of metal scraping over metal transmitted through the train with uncompromising clarity.

"A couple of bucks a week extra for oil wouldn't do the city any harm," Hertzog muttered to himself. The warning hooter made him drop his feet into the stirrups. The train slid forward, seemed to find its footing and shot ahead, motors singing, building up acceleration with considerable speed as it dropped down the initial incline, then, when it hit the long level stretch, settling down to a steady two hundred miles per hour, down the evacuated tube under the sea, toward the long, bleak, deadly coastal plain over which the tube ran within its massive concrete shield, toward the mountains which were the western frontier of life in Europe.

The line was single-tracked except where it paired at the terminals. And just before the tube broke the surface at the shore of France, there was a siding into which Hertzog's train was switched while an outbound train rumbled by. Hertzog peered curiously out through the portholes at the emergency platform along the siding. There were, supposedly, elaborate automatic provisions for shunting off trains with internal malfunctions and holding them here, just as there were safety blocks which kept two trains from meeting head-on in the tube proper. They seemed to work—either because everything was so efficiently designed or because there was a high *esprit de corps* among the air-suited trackwalkers who maintained the right of way.

Here on the shunt track, idling beside the wall of the main tube, the train was once more in an air lock, so that the passengers could, if need be, escape from a disaster to the dubious shelter of a substation which did not communicate with the surface. Hertzog got out of his chair and pulled the switch on the compartment door. It hissed back with an explosion of compressed air, opening on a bleak concrete platform with rust stains washed over its surface and grime everywhere.

"Please," a recorded voice said over the train's automatic public address system, "Do not exit except in genuine emergency. Please close the door."

Hertzog shrugged and reclosed the door. He went back to his seat. "Just wondered if it could be done," he said innocently to no one in particular.

Basle was disquieting for Frank Hertzog. For one thing, the buildings straggled every which way up hill and down dale. For another, everybody wore drab, soberly cut clothing. "Look like a bunch of bankers," Hertzog muttered to himself, getting on an elevator in the liquor distributor's office building.

"I beg your pardon, sir?" the elevator operator said unctuously, with a repressed sniff for Hertzog's clothing.

"Fourteen, Charlie," Hertzog said.

"Yes, sir."

"You in somebody's army, Charlie?"

"I beg your pardon?"

"You forgot to say 'Sir.'"

"Sorry, sir."

"Horsefeathers!"

"I beg—"

"Stop it, Charlie. I couldn't stand it. Why don't you come on out to Atlantis and get yourself a decent job?"

"*Atlantis,* sir?"

There was no mistaking the connotation in the operator's voice.

"Y'know, we only eat babies on ritual occasions, any more. Most of us have lost our taste for 'em entirely, and have to sort of force ourselves. Personally, for instance, I don't think they're any good at all, boiled, the way they serve 'em. Roast, now, that's a different story, but you hardly ever get 'em that way, any m—"

"Fourteen, sir," the operator said stiffly.

"Thank you, Charlie," Hertzog said, and stepped out facing the hall door of the liquor house. "Don't take any wooden propaganda, now."

The president of the liquor wholesalers was a man named Mott, with a receding chin and prominent teeth. "Mr. Hertzog," he said, fluttering his hands, "I don't know what to say."

"Well, then, say it," Hertzog drawled, leaning back in his chair.

"Ah . . . it's not usual for the customer's Chairman of the Board to personally deliver so much cash."

"Ahead of time," Hertzog added.

"Ah . . . yes. Now, well, frankly, Mr. Hertzog, I don't know—"

"Weren't you expecting it?"

"Expecting it? Oh, yes, yes, we certainly were, but not until—"

"You can't ship until the 15th, even with the cash on hand today, is that it?"

"Well, yes," Mott said gratefully. "I'm gratified that you understand."

"Yes," Hertzog said. "So am I. We could have gone around in circles forever, couldn't we?" He stood up and shook Mott's hand. "Have to be pushing along now. Pleasure to've met you, Mott." He strolled out, caught a taxi to the tube terminal, and went home, whistling a song which began with: "If all little girls were like Mercedes Benzes—"

It was well over a week, now, since he had been elected assemblyman for his district, and Frank Hertzog had gotten accustomed to the idea. It was nine o'clock on the night of July 14th, and he was riding down

the pylon elevator with Hoke Bannister.

"So it's pretty well settled down all around," he said. "With a new administration in Atlantis, the Mainland governments are holding off on any ideas they might have had about embargoing freight through the tube. There are three American shippers who are going to route their hard goods through here, and if that works out as well as it ought to, there'll be more. The transatlantic airfreighters don't care one way or the other, so long as we don't try to build a fleet of cargo airplanes of our own, and why should we? Our forte's quantity, not luxury."

"So Atlantis hasn't got a competitor left in the world, that it can't stand off on a fair basis, right?" Bannister said.

"Well . . . yeah," Hertzog said.

"Here's your place."

"Let's keep going on down. I want to drop in on the terminal for a minute."

"Suit yourself."

"Uh-huh. Well, anyway, it looks like Atlantis isn't going to go bust for some time. That's nice. I plan to stay in this town. The Mainland's all right to visit, but I wouldn't want to live there. They take money too seriously over there. You wouldn't believe how greedy they can get, sometimes—they'd rather risk losing out on something really good than let thirty thousand bucks go by."

"Yeah?"

"Uh-huh." The elevator sighed open at the terminal level. Hertzog strolled casually toward a train that was making up. "But I don't want you thinking every Mainlander's a penny-snatcher with no real drive. Take those boys with their zeppelin line from Capetown. That took a little something to dream up. Their rates could come to within shouting distance of the tube. And what if there wasn't any tube . . . ah, there, Mr. Keller!" he sang out, slapping the liquor salesman on the shoulder.

The prim little man threw a startled glance backward. "Mr. Hertzog!" he gasped. "Are you taking this train?"

"Thinking of it."

"Oh."

"Nothing like a trip abroad to widen the range of a man's interests, I always say," Hertzog murmured, ushering Keller and Bannister aboard the train. He guided the little man to a seat, pressed him gently down into it, and fastened his seat belt for him, talking all the while. "Actually, I'm much more impressed with tube travel than I am by aircraft. You can pretty much see what's going on, from an airplane or, say, a zeppelin, but a tube train's different. Here are all these mysterious rushing noises, and machinery and things, going on all around you in the dark, and all you can do is sit there and trust to it that everybody's done their job right and nothing's going to go wrong. That's the kind of thing that really puts a strain on your credentials as a Twenty-first Century man—the implicit faith in mechanisms you yourself don't control. Isn't that so, Mr.

Keller? Sit down, Hoke, we're about to start, I think."

The train hunched into the air lock, and then slid out. Bannister was grinning at Hertzog. Keller was pale and silent, a satchel between his feet.

"But, you know, Mr. Keller, when you come right down to it, it's the little things that really classify a culture's technology. We tend to be impressed by big, obvious mechanisms that clank and groan and tell you they're working, but the really efficient machine shouldn't intrude itself on civilized activities like conversation or high-level business, and shouldn't require elaborate installations that advertise its presence. For example, Mr. Keller, we have photostat machines now that can progressively work their way through a bundle of documents, or the contents of a brief case, and photograph each side of each sheet of paper, in turn, without anyone's knowing it. Right through the brief case, if need be. You can build that kind of machine into a wall, or a picture on that wall, or into almost anything, with the photographic head built into the ring on a man's finger." He reached into his breast pocket and took out the photostat Paulette had put on top of the stack. "Yours, Mr. Keller?"

Keller took it in shaky fingers and looked at it. "This is really too bad," he whispered. "Really too bad."

"Oh, I don't know," Hertzog said. He turned to Bannister. "That's an escrow agreement between Mr. Keller as a private party and the zeppelin freighting company. I wondered whether he'd dare trust it to a safe deposit box, and it turned out he didn't. It calls for a payment of one hundred thousand dollars—and here I'm quoting exactly—'upon the occasion of interruption in Atlantis-Mainland tube service for a period beginning midnight, July 14th.' It's in the nature of a bet. Mr. Keller has wagered that such an interruption will occur, and the zeppelin company has wagered that it won't."

Bannister said: "Oh?"

"Quite. Hoke, if you'll be good enough to peep into Mr. Keller's satchel, there, I'm confident you'll find what we might call an infernal machine."

"Sorry," Keller whispered, shrunken into his seat, his blue lips barely moving. "I'm sorry."

"Cheer up, Mr. Keller," Hertzog said. He stood up and unscrewed the bulb of the lamp over their three chairs, and replaced it with a socket adaptor. From another pocket, he took a personal intercom and plugged the antenna into the socket. He dialed a telephone number. "Mr. Traven please. Frank Hertzog calling. Wake him up." He waited, grinning at the other passengers in the compartment, while Bannister, with respectfully raised eyebrows, dismantled Mr. Keller's time bomb.

"Traven? I want the tubes shut down for repairs. That's right. Twenty-four hours from this midnight. Service and repair. Uh-huh. Vitally necessary. Results will be im-

proved service. Yes, siree. And while you're ordering that service, have 'em put in a platform watchman at the siding station, and draft plans for doubletracking and eliminating the siding as soon as they can. Yeah. We'll chip in, sure. Thank you. G'night, Traven."

He unplugged the intercom and replaced the bulb. Handing the intercom and adaptor to Keller, he said: "All ITI employes carry these. Here's yours. Good for anywhere in the world, out in the open, and any electrical connection to Atlantis underground or under water."

"You . . . you're not going to—"

"Take revenge? On you? You were only the zep company's tool. You can make the agreement stand up in court. Collect your hundred thousand from them. *They*'re the guys I want to jolt."

"Oh."

"Time bomb, all right," Bannister said. "Set to go off at midnight."

"Uh-huh. You know what this means, Hoke, with the tube shut down for the next day?"

"What?"

"It means we're going to have to fly back."

"Very simple business," Hertzog explained, his feet up on one end of his living room couch. "The zep boys had to use a man who knew the tube and habitually rode it. Keller filled their bill. But he was a company man, so he told his bosses. The bosses (A) didn't like Atlantis or Atlanteans any more than any other Mainland business did, before we changed city governments, and (B) were greedy to get me to pay for one more shipment, which they knew they couldn't deliver because the tube would be blown up. With the tube gone, Atlantis wouldn't have swung any weight with Mainland courts. I could have tried to sue for my money and never gotten within a mile of it.

"Now, Keller was figuring on the long view. He had his hundred thousand in escrow, which looked like a sure thing to his fussy mind, and he probably would have gotten a little more for delivering his company's business to the zeppelin line. Then there was his commission on the liquor sale, and his extra commission for making a sale on which there wouldn't have to be a delivery. A little bit from everybody, you might say.

"But—he came up here and told me that cock and bull story, and told me too much. He even told me when the bomb would go off—just safely after the last night train from Atlantis pulled into Basle. Well, that was a little too much. He tried to get too many things out of too many people, and he fell on his face. We were able to scrag him. Greed, Hoke, is not a useful emotion in a man who wants to make money."

"He made a hundred thousand."

"Hm-m-m . . . no, he didn't make it. That's going to be his trouble. He didn't earn it. He's the incompetent type that couldn't earn it in any way—not even a crooked way.

"And, of course, he and his money will be soon parted. Employers who pay large sums to have violent things done—say of the order of destroying a major transportation system—are of precisely the mental type to see that the incompetent employee does not enjoy his money. I'm afraid I don't have quite the right kind of psychology to give our little Mr. Keller what he did verily earn.

"Which reminds me . . . we're in the wholesale liquor business. When I found out Keller's bosses knew about his little extracurricular scheme, I got so mad I bought 'em out. A management like that ought to be shot—permitting a thirty thousand gross profit to make 'em blow the gaff on millions more! People like that—" Hertzog shook his head. "No sense of responsibility."

"So that's how Keller's an ITI employee," Bannister said, opening a bottle. "Through the liquor house. I was wondering, when you gave him the intercom."

Hertzog smiled gently, ruminatively. "Technically, that's the answer. Privately . . . well, I expect to hear, via that intercom, just precisely how Keller and his unearned increment are separated. I think he'll make a horrid noise about it."

THE END

# IN TIMES TO COME

(*Continued from page* 37)

know it means crazy stuff with bug-eyed monsters and loopy stuff like that.

I tried for some fifteen years to give the word a new definition. The movies and TV have been more effective.

Now "Analog" is a term most men-in-the-street don't know. With that title, we will, for once, be able to tell *him* what the magazine is, before our title tells him . . . and gives him a wrong answer.

O.K.—so we *do* know what "Astounding" means.

But . . . look, friends, do you mind if we try doing something that people not in the closed-corporation of science-fictioneers can understand better?

Fundamentally, "Analog" is a darned sight better description of this magazine than "Astounding," or "Flabbergasted" or even "Stupifying." The science fiction we run in this magazine is in actual fact a good analog of the science-facts to come.

If you doubt the validity of that statement—well, we have an In Times To Come department; perhaps we should, like *Scientific American,* run a "So-many-years-ago in Astounding" department. We carried a description of the "stallatron" type hydrogen fusion reactor . . . in April, 1938. The Bomb, of course, was described in 1944. The lithium hydride thermonuclear bomb, in 1947.

We've earned the title ANALOG; having earned it—we have a right to wear it!

THE EDITOR.

# THE CALIBRATED

## By CALVIN M. KNOX

Illustrated by Bernklau

HYDROPONICS Technician Al Mason had been at Lunar Base Three long enough for him to be able to know almost intuitively when one of his fellow researchers was up to something funny. Mason had a natural bent for funny-business himself, and he could sniff out a fellow culprit with an ease that would have been envied by his superiors, if they had happened to know of his talent.

Which was why Mason had been keeping a very close eye on Lloyd Ross, a recently-arrived cryogenics man. Ross had come to Lunar Base Three on the July ship from Earth. He was a short, thinnish young man with a limp yellow crewcut, and Mason had spotted something furtive about him almost from the start. There was something about Ross' eyes, and about his reluctance to invite anyone into his personal quarters, that led Mason to the instant assumption that Ross was up to something that was against the rather strict rules of Lunar Base Three. And, if there was any skulduggery going on, Mason wanted in on it.

Hydroponics Technician Mason was an old hand at dugging skuls himself. In the past few years he had taken part in virtually every jape, prank, and bit of tomfoolery that had gone on in the Moon base. By far the most spectacular of Mason's enterprises was the so-called Project Bossie, which began with a bit of tissue from a cow's udder and ended in a monstrous mechanical-and-biological device that economically converted waste cellulose into a supply of milk and meat for the entire Moon base. Project Bossie had been Mason's masterpiece. It was also one of the reasons why the high brass of Lunar Base Three looked fondly on him, despite his tendency toward irreverent violation of the base rules. The most important other reason

# . ALLIGATOR

*The Moon base was a wonderful place for Science . . . but not so good for Scientists, who, being human, need something more satisfying than pure reason. Like an improbable, and forbidden pet . . .*

was that Mason was a top-flight hydroponics man, and his department was constantly coming up with new and valuable techniques. If practical jokes were the price that had to be paid in order to keep Mason at the Moon base, the brass was willing to pay it.

But the furtiveness of the new cryogenics man troubled Mason. He hated to think that there might be something going on in the base without him.

Eight "weeks" of careful watching had confirmed Mason's suspicions without giving him any definite hints. Ross had a way of glancing around in the mess hall, and then, when he thought no one was looking, slipping bits of meat into his overalls. What would a cryogenics man want with snips of meat, anyway, Mason wondered? If he needed the meat for some experiment legitimately connected with his research, he could requisition it openly through regular channels. But if he wanted the meat, and didn't dare to go through channels to get it—why, Mason thought, that was a good sign that something peculiar was going on.

But Ross dropped no hints. He seemed to be a closemouthed man by nature, who had made few intimate friends in his two months on the Moon. He did his job, he played poker in Recreation Shed C a couple of nights a week, and otherwise he kept his own counsel. Mason's curiosity was inflamed. He *had* to know what Ross was up to.

One way to find out was to ask the fellows he worked with. So, at length, Mason buttonholed Len Garfield of the Cryogenics staff after hours one day.

"That new fellow you have . . . Ross," Mason said. "He interests me. Is he a good worker?"

"So far he's been doing fine," Garfield said. "He knows his field, and he's making plenty of progress."

"And do you know anything about him?"

Garfield shrugged. "Only what's on his dossier. Three years of graduate work at the Harvard Low-Temperature Lab, then a National Science Foundation grant to come up here and continue his work."

"What's he doing?"

"Studying heat conduction in liquid Helium II. Thermomechanical effects, stuff like that. And, of course, he's looking into second sound and other temperature oscillations. I've had a glance at his notebooks, and I'm impressed. He's got some completely fresh ideas, Al. You know that in ordinary media temperature waves are highly damped, whereas in Helium II—"

Mason held up a hand. Ordinarily he would have been glad to spend the evening discussing the peculiar properties of superfluids, but right now he had other fish to fry. "O.K. I'm sure it's fascinating, but not now. Tell me what you know about him *besides* his lab work, Len. What's he like personally?"

Frowning, Garfield said, "Oh . . .

perfectly normal, I guess. A nice quiet guy. Spends a lot of time by himself."

"Meaning that you don't know a thing about him, in other words."

"If you want to put it that way," Garfield said, "I suppose you're right."

"Have you ever been inside his quarters?"

"Have I . . . hold it, Sherlock! You working for the Security Department in your spare time?"

Mason grinned. "I'm following a trail of my own."

"Well, the answer is no. I haven't been in his quarters. He hasn't invited me, and I haven't tried to push him. A man's got a right to some privacy, even in this overgrown goldfish bowl of ours."

"I suppose you're right," Mason said thoughtfully. "Well, thanks for nothing, I guess."

He drifted off toward Recreation Shed A, where a movie from Earth was being shown. Entering the shed, Mason stood at the rear, paying no attention to the film, simply waiting for his eyes to become accustomed to the dark. Then, moving to the side of the auditorium, he looked for Cryogencis Technician Ross.

There he was, Mason thought—fifth row, on the aisle. Mason nodded and left the shed. The bulletin board outside informed him that the picture would be running until 2200 hours.

About three-quarters of the staff of Lunar Base Three was at the showing. The rest were either putting in some extra time in their laboratories, or else were engaged in bull sessions in the smaller recreation sheds. Mason wandered into Shed B. Dave Herst of Chemistry and Nat Bryan of the Solid-State team were playing chess; they were ferocious movie-haters. Mason waved at them, and settled down by himself to wait for the movie to end.

Movies were shown three nights a week. All in all, Mason thought, life at Lunar Base Three was pretty good. There were no women, unfortunately, though that was going to be remedied next year after the dome-expansion project. But all else was fine.

Lunar Base Three was devoted to pure scientific research. The cream of America's college graduates fought it out for the honor to do research up there. About half of the base's complement was there on short-term grants, ranging from eighteen months to five years. Others, like Mason, had won the right to indefinite work there.

Lunar Base One was an astronomical observatory, the best there was. Base Two was a munitions dump, in which missiles and bombs gathered dust against the eventuality that the long-stalemated Cold War might suddenly become hot. And Base Three was staffed by researchers in just about every form of physical science.

There were five other domes on the Moon. The Chinese had one, another belonged to India, and the rest

were Russian. Outpost Lenin was the Russian missile base. Outpost Tsiolkovsky was the Soviet observatory, and Outpost Kapitza was the Russian equivalent of America's Lunar Base Three.

Idealists staffed Base Three, and idealists had invented it. The researchers had unlimited time and almost unlimited funds—subject only to the annual caprices of Congress. Even in A.D. 1996, there were some legislators from obscure regions who simply couldn't understand the point of throwing away billions of dollars on a laboratory on the Moon. There were annual snipings at the Base Three appropriation. For that reason, there were certain restrictions in effect. Conspicuous waste had to be made inconspicuous, and conspicuously pie-eyed projects had to be kept under cover, for fear of Congressional vengeance. Economy measures had to be observed.

Otherwise, though, the cosmos was the limit. And the men of Base Three, in their foggy-eyed impractical way, had managed to pour forth a torrent of highly practical inventions, of which Al Mason's mechanical milk-synthesizer was only one.

The movie broke at 2200, right on schedule. Mason came to the door of the Recreation Shed and looked out, hands on hips, searching for Ross.

At last he spied the Cryogenics man—by himself, as usual—heading across the compound toward his quarters in D Dormitory. Mason nodded. He waited five minutes, long enough for Ross to enter the long, low hut. Then Mason trotted across to D Dorm himself.

He knocked on Ross' door. There was no answer. Mason knocked again, louder, and this time Ross said thinly, "Who . . . who is it?"

"Al Mason from Hydroponics. Mind if I visit with you a while?"

Ross opened the door about five inches and stuck his face out. "H-hello. I'd invite you in, but my room's a mess. Why don't we go down to the Recreation Shed and talk there?"

Smiling, Mason gently shoved the door open. He was half a foot taller than Ross and at least fifty pounds heavier, and not even determined resistance could have kept Mason out. He said, "It's too noisy in the shed. Let's stay here."

And he was inside the room.

Ross had gone white. Mason sat down and glanced around. The room looked like any other room in the jerry-built dorms—small, with a low, curving ceiling, and rudimentary furniture. Ross kept it spotlessly neat, every book in place, every pencil on his desk aligned with precision. There was just one exception to the general neatness, and it was a glaring one. At the far side of the room, a heap of soiled laundry was stacked on the floor. It was a startling exception to Ross' apparent love of orderliness.

Mason said casually, "Len Garfield tells me you're a liquid helium specialist. I'm interested in superfluids myself—as a layman, you

understand; just an amateur's curiosity—and I'd like to talk about them a little. If you don't want to talk shop after hours, just say so, and I'll leave."

Ross seemed to be tempted to take the out. But, realizing apparently that it would be churlish, he said instead, "That's perfectly all right. I . . . I like talking about my work. What would you like to know?" He seemed frantically nervous. He kept glancing toward the heap of old laundry in the corner.

Mason said, "Well, there's this whole business of frictionless flow, for one thing. The uphill flow against gravity. It fascinates me. Could you tell me a little about it?"

Ross launched into a complex monologue. "To begin with, of course, you have to understand that liquid Helium II supports two different kinds of thermally-excited motions. We call these motions phonons and rotons. Phonons, you see, are quantized packets of Debye waves similar to those in crystal lattices. The rotons are rotational or vortex motions with quantized angular momentum, and—"

Mason's face was a study in grim concentration. He frowned and grimaced and ground his forehead with his knuckles, and after a few minutes he rose and began to pace the little room, while Ross continued talking. Mason approached the pile of laundry. Glancing around, he saw sweat-beads pop out on the Cryogenics man's thin face.

Mason said suddenly, "Hold it. You're getting out of my depth here. Let me sit down and go back a couple of steps." He swung round and began to lower his two hundred pounds of bone and muscle onto the pile of laundry.

"Watch out!" Ross screeched. "Don't sit there!"

Mason halted in a half-squat. "Why not? It's only a pile of old laundry, isn't it?"

"Yes, but—"

"It can't get any more crumpled if I sit on it."

"Please . . . it's a neurosis I have . I hate to have people sit on my laundry—"

Mason smiled. "Weirdest neurosis I've ever heard. Well, I'll just push the laundry aside and sit down next to it, then."

"No—don't do that either!"

Mason stood up. Slowly he said, "You wouldn't be hiding something under that laundry that you wouldn't want me to see, would you?"

Ross goggled. "What . . . would . . . I . . . want . . . to . . . hide?" he said in a strangled voice.

"I can't imagine. But it wouldn't matter if I poked through it, then." Mason knew that what he was doing was a wanton invasion of personal privacy. But he suspected that he was on the trail of something more than usually amusing.

Ross let his shoulders slump. "You knew all along, didn't you?"

"Knew what?"

"That I was breaking the rules. I've seen you staring at me, spying on me. Well, it was inevitable that you'd

find me out. Here. Take a look, and then you can go report me to Base Commander Henderson."

Ross scooped up the laundry. A glass tank about a foot and a half long had been hidden underneath. Mason squatted to take a close look.

A ten-inch alligator looked back at him.

Mason gasped. Automatically he quoted from the base rules: " 'Staff members shall not bring personal pets of any sort with them from Earth. Any animals discovered in the base will be confiscated and are subject to destruction.' "

"I know," said Ross miserably. "But I couldn't help myself. I couldn't leave the little creature behind."

"So you brought an alligator with you to the Moon," Mason muttered. "Of all the screwball things—"

"It was a gift from my brother," Ross explained. "A going-away present. I've never been the pet-keeping type, you see, but somehow the alligator caught my fancy."

"How did you get him here?"

"In my allotment of equipment. I smuggled him in marked *fragile*. Aboard ship I didn't need to feed him—they can go a few days without food. I knew it was a foolish thing, but, well . . . I was fond of him." Ross looked utterly shattered. "It's a shame that he'll be destroyed now."

"Who said he'll be destroyed?" Mason asked.

"Why . . . it's against the rules to have a pet here. And you'll report me, and Commander Henderson will take Caligula away."

"Caligula?"

"That's what I call him," Ross said, reddening even further.

Mason frowned. "The rule was designed to keep people from cluttering the base up with dogs and cats that might get underfoot and cause a general nuisance. Still, once you start making exceptions—" He shook his head. "We'll have to think up something."

"You mean you *aren't* going to report me to Henderson?"

Mason laughed and said, "Are you kidding? It's been months since I've broken a rule up here. High time I was involved in some mischief."

"I don't understand."

"Listen, Ross. I admire your spunk for smuggling this little green beastie up here. It shows you're flexible enough to ignore some of the rules that don't really matter. So I'm going to do all I can to help you out."

"Will you talk to Commander Henderson for me?"

"Uh-uh. A rule is a rule, and your pet would have to be confiscated if Henderson found out. So we've got to take some other tack to save poor Caligula here. When is a pet not a pet? Let me figure that one out for a while. The important thing," Mason mused, "is to change Caligula's status, and fix it so he's part of some important project up here—"

Within five minutes, Mason had formed his plan. He expounded it to

Ross, who nodded with almost pathetic gratitude. The little Cryogenics man had been frightened stiff that the illegal presence of the alligator might cost him his grant or otherwise get him into serious trouble, and the fact that the celebrated Al Mason was scheming to help him reduced Ross to a pitiable state of thankfulness.

Mason was amused. Caligula was an attractive little creature, with his beady eyes glinting up out of the tank observantly, with his blunt snout seeming to turn up into a knowing smirk. To Mason, the animal was a symbol of mild, harmless rebellion against a constricting and sometimes mindless set of regulations.

Ten minutes later, the number of conspirators had been increased to three. Mason summoned Ned Rankin of the Biology staff to Ross' room. Rankin was an elongated scarecrow type of man, fiercely devoted to his work, and somewhat lighthearted about observing any of the base rules for which he personally had no use.

Mason had not told him why he was wanted at Ross' room. When he showed up, he was frowning darkly. "This had better be important, Al. Otherwise you're gonna be on my spit list. I was busy with—"

Mason cut him off. "Ned, you know Lloyd Ross of Cryogenics, don't you? Lloyd, Ned Rankin."

The two men nodded. Everyone at the Lunar Base knew everyone else at least by name, if not more personally. Mason said, "Ned, I think you ought to know right at the start that Lloyd here has violated a base rule."

"So what? Is this a kangaroo court?"

"I just wanted to make it clear. We're going to take you into our confidence," Mason said. "If I didn't think I could trust you, I wouldn't have asked you over here. Ross, show him Caligula."

Carefully Ross lifted the bundle of laundry, revealing the tank. Rankin unlimbered himself, strode over, peered down from his six-feet-five. He blinked.

"An *alligator?*"

"That's right," Mason said. "An alligator. It's a pet of our friend here. He was so fond of the critter that he couldn't bring himself to leave him behind on Earth, so he smuggled him in."

Rankin began to laugh. He scooped the alligator out of the tank, placed him on the palm of one enormous hand, and tickled him under the chin. Legs kicked in various directions. The tiny jaws clashed menacingly on emptiness. Rankin dropped Caligula back in his tank.

"Cute," he said. "Did you call me all the way over here to look at an alligator?"

Mason nodded. "As it stands now, the alligator is Ross' responsibility. And pets are strictly *verboten* up here, as you know. But Ross here would be heartbroken if the C.O. disposed of little Caligula. So it occurred to me that we could ensure the 'gator's continued good health by making him part of some official

project up here. Maybe some project of the Biology Department. I seem to remember that a couple of months back you were talking, Ned, about importing some baby reptiles for a growth-acceleration project you had in mind—"

The beanpole biologist frowned. "Yes, but I wasn't planning to get started on that project for another six or eight months—"

"It wouldn't upset you too much to change your schedule, would it?"

"I suppose not," Rankin said thoughtfully. "Let me see, now—"

Ross spoke up. "Would you mind telling me what this project is, Dr. Rankin?"

"Well," Rankin said, "its all based on the desire to make the Lunar Base self-sufficient foodwise. We're already growing all our own vegetables, thanks largely to Mason here and his Hydroponics Department. And we get milk and liver from the artificial cow, also thanks to Mason. But the big problem is obtaining

other kinds of fresh meat. We don't have room for a stable up here, you understand."

"Naturally."

"But," Rankin went on, "there is one life form that is potentially feasible for being farmed here. That would be an herbivorous reptile."

"Reptile? You mean you'd have us eating *alligators?*"

Rankin grinned. "No, not alligators. Caligula is safe. Alligator meat isn't the tastiest in the world—and anyway, alligators are carnivorous, which makes them inefficient as meat-sources. But an herbivorous reptile has all sorts of special advantages efficiencywise.

"Right now, as you are somewhat too well aware, fish and chicken are about the only meat people can get at a reasonable price. And we're all just a bit tired of them. Chicken because the birds grow from egg to market size—thanks to selective breeding and growth-stimulators—in a matter of weeks. That makes for low overhead and low labor costs. And they grow so fast they don't have time to dissipate much of the food-energy intake in running around, or in maintaining body heat. Four or five weeks, and they're marketable.

"The only thing that could be more efficient would be a fast-growing, indolent, herbivorous cold-blooded animal; it wouldn't even waste food-energy maintaining body temperature!

"That means a reptile, of course."

"But are there such herbivorous reptiles?" Ross asked. "Oh . . . and can they be eaten without getting used to the stuff?"

"The answers are yes and yes—emphatically. The iguana for instance. It grows about four feet long and gets along fine munching celery and lettuce, with a couple of bananas thrown in for variety. And the meat is delicious—a delicacy in South America. It's as good as veal—besides which it would be a welcome change from fish and chicken. Mammals are hopeless as an efficient meat source; their high evolution means a long developmental period, a lot of care —either by the parent or a herder— and they waste most of their food-intake keeping warm.

"A reptile hatches from eggs—and most of them lay a lot of eggs at a time! —and gets no care from anybody. It's primitive—even more primitive than a chicken—and develops rapidly. They're tough, not susceptible to disease particularly. And don't think they have to eat lettuce and celery! Some of your less desirable hydroponics glop would do fine. No work has been done, so far as I know, on trying to find the growth-stimulation factors for reptiles, nor toward breeding a fast-growing meat-animal of the reptilian order."

"I still don't understand what my alligator has to do with this, though."

Mason said, "Rankin has been doodling up a process that accelerates the growth of reptiles, you see. It takes an iguana years to reach a

length of four feet. If that process could be speeded up—say, to one year, or six months—we could keep a couple of tanksful of the critters here, and use them for Sunday dinner."

"Exactly," Rankin said. "So far my growth-acceleration technique is strictly theoretical, just on paper. I was planning to ask for an appropriation in a couple of months, requisition a few iguanas from Earth, and get started. But now's as good a time as any. And I can use this alligator as my first experimental animal. He won't be edible, of course, but he'll help to prove the general utility of the process. After that I can apply it to edible herbivores. And in the meanwhile we'll have saved Caligula from a horrible fate, and you from a reprimand."

"What is this process?" Ross asked uneasily.

"What it involves," Rankin said, "is biochemical growth stimulation. Give the alligator optimum living conditions, for one thing. Then apply treatment. Antibiotics, hormones, the works. An alligator normally grows at a rate of one inch per month, pretty near. So we take Caligula here and fix up a little niche for him in my bio lab, and we see how fast we can make him grow. If he responds, we know the treatment is useful. We can start raising iguanas up here, combining my treatment and some selective breeding to get them to size, and Lunar Base Three has a dandy new source of food."

"Not only Lunar Base Three, of course," Mason put in. "It's fine for us, but it's a lot more important for our employers down there—the five billion people of Earth. It'll be a really major breakthrough in food supply down there. Not to mention the future potential when we start colonizing the planets."

"But if you put the alligator in your lab, I won't be able to see him," Ross objected.

"Sure you will," Mason said. "Ned will let you visit him whenever you want. Which is better, anyway—an alligator living in the bio lab, or one who gets confiscated and fed into the garbage converter?"

Ross gulped. "I see what you mean."

"There's one problem," Rankin said. "I can't very well begin the project unless I have some way of accounting for the presence of the alligator up here. Suppose Henderson wanders in and sees the creature, and wants to know how he got there? Am I supposed to tell him that he was smuggled up by Ross?"

Mason smiled confidently. "Never fear. I'll handle that part."

The next day, Mason wandered over to the Administration hut during his lunch break. He sauntered casually past the base commander's office, which was unoccupied at the time, and entered the office of the Requisition Department.

Sam Donohue, the chief Requisition clerk, was out of the office. It was just as well, Mason thought.

That meant that his assistant, Harry Gardner, would be in charge.

Gardner looked up from a forest of paperwork. "Anything I can do for you, Al?"

"Matter of fact, there is. I want you to make an ex post facto requisition for me."

Gardner's watery eyes bugged with puzzlement. "Huh?"

Mason leaned down low over the requisition clerk's desk and whispered hoarsely, "I want you to make an addition to the June requisition list for me.'

"But that was months ago, Al. What good would it do if—"

Mason drummed his fingers on the desk. "I want you to correct an irregularity for me. Something was brought in on the July ship without being requisitioned. We have to juggle things so it looks legit."

"You mean, something was *smuggled* in?"

"Indeed something was," Mason said. "You and I both know that we can't allow smuggling up here. So get the June requisition list out and let's fix things up right now."

Gardner shook his head. "That wouldn't be right, Al," he said dimly.

Mason favored the clerk with a cold smile. "How would you like it if the C.O. found that you used the taxpayers' money to ship twelve ounces of lunar pumice to a girl friend of yours in Fond du Lac, Wisconsin, Harry?"

Gardner gaped. "How did you find out about—"

"It helps to have quick eyes," Mason said. "I saw the package being loaded, and I knew what was stamped on it. You finagled that package out of here postpaid, strictly against regs, and charged thirty bucks' shipping costs off to the general expense fund."

"But everyone does that, Al!" Gardner said weakly.

"That doesn't excuse you," Mason snapped.

Gardner looked like a gaffed fish. He made a few more feeble attempts to wriggle, then gave up and dug into the files for the master copy of the June requisition sheet.

"Here are the filled-in requisitions," Mason said mercilessly. "Rankin of Biology signed them. They're dated June."

Gardner riffled through the triplicate blanks. "One live baby alligator?" he said faintly, incredulously. "But—"

"Never mind. Insert it."

The master requisition list had already been checked by Commander Henderson, and bore his initials. It was strictly non-kosher to add anything to the list after it had been signed. But Gardner found a blank space and obediently typed the alligator requisition in. Then he inked in the official symbol that meant the goods had been received in July.

"Fine," Mason said. "Now file everything away and forget the last ten minutes. If Henderson ever starts wondering how the deuce an alligator got to the Moon, we can dig this

out and prove that he O.K.'d the requisition himself."

Gardner looked dazed and glassy-eyed. "Sure, Al. Sure. Uh . . . you won't say anything about that box of pumice—"

"Not this time," Mason promised. "I'll save it until the next time I need a favor. So long, Harry."

So it was all duly arranged, as Mason reported back to Ross and Rankin. Thanks to the chicanery in the Requisitions Office, Ross could no longer be accused of smuggling Caligula into the base. It was demonstrable that Rankin had requisitioned one alligator in June, and that the animal had duly been shipped and had arrived along with Ross on the July ship. Naturally, there would be no record of the shipment on any of the Earthside documents, nor on the cargo manifest of the Earth-Moon ship. But it was not likely that Commander Henderson would go to the trouble and expense of checking the Earthside documents. If he happened to bridle at the presence of the alligator in the bio lab, Rankin could maintain that he had requisitioned it months before for legitimate research purposes, and the commander would have his own initials on the requisition sheet to prove it.

The paperwork taken care of, Caligula was duly transferred from his hiding place in Ross' quarters to an inconspicuous corner of Rankin's cluttered laboratory.

Ross looked doubtfully at the alligator's tank. "You aren't going to harm him in any way, are you?" he asked Rankin nervously.

The biologist scowled. "My friend, don't you see that my scientific reputation depends on keeping this scrawny little reptile alive and healthy?"

"Still, all this apparatus—"

"Necessary for measurements," Rankin said. He looked in appeal at Mason. "Al, will you vouch for the fact that this alligator is going to get the best of care here?"

"Sure," Mason said reassuringly to Ross. "Let me tell you—Rankin's going to treat Caligula the way he would probably treat his own child. Better, perhaps."

Ross nodded. "I'm not really worried. I'm just naturally pessimistic, I suppose."

"And now," Rankin said, "if you two will clear out of here and let me get my work started—"

Mason and Ross returned to the biology lab later in the day. By that time, Rankin had already surrounded the tank with an elaborate and impressive array of equipment. And the biologist had the pleasantly frayed expression that implied he had put in a busy day.

"Well?" Mason asked.

"I'm getting under way," Rankin said. "First step is to assure optimum temperature for growth. If the tank and environment's too cold, the alligator becomes torpid; doesn't grow. If it's too hot, he'll go dormant, too. The trick is to keep his environment

at just the precise temperature for maximum stimulation.

"Antibiotic treatment comes next. I've got half a dozen different things I want to try. They've all worked as growth stimulants in the past on other creatures. I'll work them in one at a time, starting with hydroxyphenylarsonic acid. Then there's the hormone treatmetnt too, and some other things."

"What about food?"

"I've arranged it with the kitchen; they'll give me all the meat I want, from that cow of yours."

Mason peered into the tank. The alligator was paddling slowly up and down, looking cozy and contented. Ross looked in, too. The man was positively beaming, Mason thought. He shrugged: there were those who loved cats and those who loved dogs; but he hadn't figured it was possible to work up much of an affection for an alligator.

"How . large will he get?" Ross asked.

"That's one of the questions I mean to answer with this experiment," said Rankin. "You know, theoretically a reptile can keep on growing just about forever, if he gets enough food and has optimum climate. We're in a position to supply both here. But I'm not so much interested in how big Caligula gets, as in how fast he grows."

Mason nodded. "Be careful not to turn him into a blasted dinosaur. He could start getting cumbersome after he hits the forty-foot mark."

Ross looked apprehensive. "It s too bad alligators have to grow up, isn't it?" he said. "They look so cute when they're this size."

"Thank you, J. M. Barrie," Mason said acidly. "I suppose you wish Rankin here was experimenting with a growth *inhibiting* process, instead of an accelerating one."

Ross smiled wistfully. "That would be nice, I suppose. But I mustn't be silly about this. I've got to thank you for taking me off the hook, Mr. Mason."

"Don't mention it, son. You gave me a chance to mess around with the regulations, and I'm always grateful for the opportunity to have some fun. Let's get out of here now. Rankin looks busy."

"I'm going to take measurements," the biologist announced. "I'll keep a daily record of growth. Let's see now—September 17, 1996, length twenty-seven centimeters from snout to tail—"

Mason laughed. "The Calibrated Alligator! Science, it's wonderful!"

For the next few weeks, Mason paid frequent visits to the biology lab to see how Caligula was coming along. And the alligator's progress was, to say the least, alarming. Rankin waxed rhapsodic over the success of his various growth-stimulation notions. And Caligula was growing, if not precisely while one watched, then almost as fast. Rankin's process had galvanized the animal into expansion.

After the first month of life in the laboratory, Caligula had grown

not the expected inch, but two and a half. During his second month of laboratory life that rate was exceeded; he added slightly more than three inches to his length, and now was no longer so cute and lovable-looking as he had been when his total body length was ten inches, tail included.

As the novelty of visiting the animal wore off, Mason's visits became less and less frequent. As a result, the increased size of the alligator was startling in the extreme whenever he did go to see the animal. It was difficult now to picture Caligula as he had been at his tiniest. By the time five months had gone by, he had more than doubled his length, had required a shift to a larger tank, and was starting to look slightly formidable.

"I've got him on a high calcium diet," Rankin explained. "Otherwise his bones would be too weak to support him, at the rate he's growing."

"How much does he eat?"

Rankin shrugged. "About as much as he can get. It's about time for feeding him, anyway."

From a small refrigerator, the biologist produced a chunk of meat that had evidently been sawed from the proliferating tissue-culture growth of Mason's milk-producing machine. Rankin dropped the chunk into the water of Caligula's tank. The alligator had been "sunning" himself on a rock beneath an ultraviolet lamp that Rankin had rigged.

Caligula glared at the chunk of meat for a long moment. His protruding eyes were fixed glassily on it.

His snout opened suddenly. Mason heard a chumping noise, and abruptly the meat no longer was in the water.

"He'd eat a chunk the size of my fist, if I gave it to him," Rankin said with a kind of pride.

"Does Ross come here often?"

"Every night," Rankin said. "But he looks a little dazed. I don't think that poor kid was really expecting his alligator to grow up at all."

Mason snorted. "There are times when I suspect that Ross hasn't grown up at all, himself. But they tell me he's a good cryogenics man, so I suppose he's entitled to go goofy over a reptile." He peered at the sleek brown alligator, remembering the time when Rankin had held him on the palm of one hand. It wouldn't be wise to try that now, not with the alligator better than two feet in length.

"Has Commander Henderson seen it?"

Rankin shook his head. "The commander hasn't been in this particular wing of the lab for months, thank goodness." Rankin began to giggle. "Lord, I hope he keeps out of here for about six more months!"

"Why?"

"By that time Caligula ought to be about four feet long," Rankin explained. "I want to see the look on the C.O.'s face when he finds four feet of alligator in his biology lab!"

During the next few months, Mason had little time to spend visiting the alligator, and rapidly Caligula slipped from his mind. Mason was busy with his own work, which included five or six major hydroponics projects and several dozen minor ones—and, besides operating in his specialty, he had the extra job of co-ordinating the team that was designing an improved and more efficient Bossie. The original milk-converter had been built by ear, so to speak, with improvised attachments surreptitiously added as they became necessary. But Henderson had been so impressed with the result that he had commissioned Mason to build a new Bossie, this time working from the ground up and perhaps avoiding a few of the drawbacks of the Mark I model.

The multiple jobs kept Mason busy. So busy that he forgot all about Caligula. From time to time he would run into Ned Rankin, who would give him a progress report—"Still growing," or words to that effect. Mason would nod and say, "That's nice," or words to that effect.

Time passed, and it was now a year since Rankin had begun the alligator-augmentation project. It was late one afternoon; Mason was busy in his hydroponics lab, breaking in a couple of kids newly arrived from Earth, and it was only when Mason saw the pale and puzzled faces of his apprentices that he realized someone was standing behind him.

Mason turned and found himself staring into the lean, alert face of Base Commander Henderson. Mason double-took, recovering balance reasonably swiftly.

"H-hello there, sir. I . . . I didn't hear you come in, I guess. Sorry."

"That's all right, Al. I was just standing here listening to you talk. You have a very pungent way of expressing yourself when you instruct newcomers."

Mason smiled uncertainly. "Thank you, sir." He was inwardly tense, wondering just what he had said in the five or ten minutes Henderson might have been standing there. From time to time the C.O. developed a Haroun al-Raschid complex, and went wandering about quietly eavesdropping on his subjects. This was evidently one of those times.

But Henderson looked worried. He had that preoccupied frown that could only mean he was getting a hard time from *his* superiors down on Earth.

"Al, could I talk to you privately for a minute?"

"Of course, sir."

They drew away, leaving the apprentices to mutter to each other. Henderson said, "I've just received word from Earthside that the Russians have announced that they're going to telecast from Outpost Kapitza soon."

Mason frowned. *"Really?"*

The C.O. nodded sadly. "Afraid so. Some time in the next two or three months they're going to beam a

show all about Kapitza to Earth. Good propaganda, I guess. Unveil the top-secret laboratory, show what they've got hidden away in there. Impress the world with Soviet scientific prowess." Henderson scowled. "Naturally, you know what the Pentagon wants me to do."

"Stage our own telecast, sir?"

"Exactly. Project Me-Too. The merciless eye of the video camera is going to get turned on every dusty corner of Base Three."

Mason's posture sagged wearily. "Heck, sir, what's going to be so fascinating about showing a bunch of test tubes and voltmeters and stuff?"

"I don't know, Al. But we've got to put on the show. That's why I'm making the rounds and talking things over with all the department heads. You've got to start getting your lab shaped up for video."

"And I suppose we'll have to be ready for the cameras next week, so we beat the Russkies."

"Thank goodness, no. We're not doing our show until after the Russians have had theirs. That way, Earthside claims, we'll be able to outdo them. Let them stick their necks out first, in other words." Henderson glanced around. "Will those giant tomatoes be ripe by February?"

"January, sir."

"Delay them till February somehow. Or else get a new batch started that'll be just ripening in February. A couple of shots of tomatoes

the size of basketballs is just what we'll need, Al."

"I'll do my best, sir."

"Naturally we'll have to slick the place up a little, too. This is five times as bad as having a few Congressmen come up to inspect. We're having the whole blasted world inspecting us! And I wouldn't want us to come off second best to the Russkies in anything, not even neatness."

Mason nodded.

"One more thing," Henderson went on. "We're planning to give your mechanical cow a big build-up. It's the sort of thing the public will really go for. Yankee ingenuity, all that sort of stuff. Will the new model be in working order by February?"

"I doubt it, sir. You wouldn't want us to rush it along just to make a TV deadline, would you?"

"No, I wouldn't. We'll show the Mark I, then. In fact, that's better than showing the Mark II. The Mark I is so complicated-looking, you know—it'll make a big hit with John Q. Public."

"The more complicated it looks, the more scientific he thinks it is. I get you, sir." Mason smiled. "Is there anything else, commander?"

"Not for now, Al. There'll be regular bulletins as we get this thing shaped up. You'll be asked to submit a sketch of the things you want to be shown in your section. But don't let this nonsense interfere too much with regular work." Henderson made a sour face. *"Propaganda! Pfui!"*

That was just about Mason's own attitude. Lunar Base Three was a research lab, he thought, not a video studio. The thought of cameras poking into one chaotic lab after another irritated and angered him. For the next few months, he knew, there would be nothing but another mass tidying-up campaign to make the base look shipshape for the video show. Mason shrugged; Earthside paid the bills, and, he supposed, they were entitled to call the tune. If only the Russkies weren't so propaganda-conscious! And if only we didn't have to play monkey-see monkey-do whenever they made an announcement!

"O.K." Mason hollered to his apprentices. "Let's get back to work!"

For the next half hour he worked them over, only partly resisting the temptation to take out a little resentment on them. He was showing them the algae tanks when the office phone rang. One of the apprentices picked it up.

"It's for you, sir. Dr. Rankin of Biology."

Mason grabbed the phone. "Hello, Ned. What's up?"

"The jig, that's what," Rankin said in his hollow voice. "Henderson was just here to tell me about some stupid video show that we're all involved in."

"Yeah, I know. He was here half an hour ago to tell me about it."

"Well, I was down in the lower lab when he came, and he went in there. And he saw Caligula."

"At long last, huh?" Mason laughed. "He must have been surprised."

"Surprised? He almost shot through the dome."

"You mean he was sore?" Mason asked.

"Al, you haven't seen dear little Caligula in a while, have you?"

"No, not for a month or two. Why?'

Rankin said hoarsely, "Al, he's four and a half feet long. I've got him in a tank twelve feet long, and he needs a bigger one."

"Well, what of it? Why was Henderson annoyed?"

"For one thing, because he didn't know anything about the project. He demanded to know where I had gotten an alligator from. He thought it was a crocodile, by the way. I told him I'd requisitioned it a year ago. Played it real innocent, you know. Told him he'd O'K.'d the requisition and everything. He looked at me as though I were crazy. Got on the phone, called up Sam Donohue, and asked him to read off every requisition on the lists for May, June, and July 1996. Sam got to the middle of the June list and read off, *'One live baby alligator,'* and claimed the sheet was initialed by Henderson. Al, have you ever seen a man go purple in the face? Henderson did."

"And where did it all end?"

"He took Donohue's word that he'd signed it—but says he doesn't remember O.K.'ing any requisitions for alligators."

"Naturally not."

"He claims I must have slipped it through on a busy day, or something."

"Did you explain how successful your experiment is?"

"Yes," Rankin said. "He didn't object to that. He just wanted to know how much bigger Caligula was going to get. He also wants me to file a complete report on the experiment by next Monday."

"Go to it, man!"

"I intend to. But I'm beginning to wish I hadn't ever gotten myself mixed up in this, Al. Something tells me Caligula is going to get a little too big to handle."

Later that evening Mason paid a visit to the bio lab. It was empty; most of the base was at the movies. Mason made his way past the cluttered workbenches into the room where Caligula was kept, and switched on the light.

The alligator's tank was in the center of the room. It was an enormous tank; Mason wondered where and how Rankin had scrounged it. It was ringed with thermometers and other indicating devices of an indescribable variety, each one probably measuring some chemical component of Caligula's water. The alligator himself was perched regally atop a huge lump of lunar rock, basking beneath an ultraviolet lamp. He swiveled one goggly eye around and fixed it on the intruder. The front of his snout still turned up in a grin, but efficient-looking teeth showed around the edges. Caligula had taken on much of the ferocity

of his ancient namesake. He bore himself with pride, as he well might, considering that he was some three times the size of every other alligator born in his brood.

Mason picked up a notebook near the tank. Rankin was recording length measurements. The most recent entry had been taken two hours before; converting out of centimeters, Mason figured it as four feet seven and a half inches. Pretty big for a critter who had been pint-sized only about a year ago. Rankin had succeeded with a vengeance.

It was not until the following Monday, though, that Mason discovered how phenomenal Rankin's success really had been. To be precise, it was 0100 hours on Monday, and Mason was in his quarters getting ready to grab some sleep, when there was a knock at the door and the familiar cavernous voice of Rankin said, "It's me, Al."

"Come on in."

Rankin was carrying a thick portfolio. He sank down limply in a chair, collapsing like a bundle of loose slats, and groaned.

"You look beat," Mason observed.

"I've been working on the report for Henderson all week end—the report on Caligula. Just finished it. Got it right here. Al, I'm scared green."

"Scared?"

Rankin nodded. "I tabulated all my statistics on Caligula and gave them to one of the math boys to run through the computer. He brought me the results a little while ago." Rankin moistened his lips and drew a yellow sheet from his portfolio. "It seems that Caligula's growth curve is going to keep sweeping sharply upward for a while. If I keep him on the treatment, he's going to grow at a rate of pretty close to nine inches a month for the next six months, and after that at a rate of eleven inches a month until he reaches the length of twenty feet. A size which he will attain, let me add, in approximately another year and a half."

*"Yoik!"*

"Once he's reached twenty feet," Rankin went on, "the growth curve will steadily diminish, until by the time he's forty feet long he'll be growing no faster than an inch a year, or so. It's an asymptotic curve, incidentally. He isn't *ever* going to stop growing completely for the rest of his natural life. Which, if we coddle him the way we're doing, will be a minimum of a hundred years."

Mason made a gargling sound. "Forty feet . . . a hundred years—"

"The laboratory I keep him in," Rankin continued, "is exactly twenty-four feet eight inches in length. Obviously it isn't big enough to hold Caligula more than another six months. What's more, by the time he's twenty feet long there won't be *any* lab any place in the base where he can be kept and still have room to turn around in."

Mason smiled mirthlessly. "You realized this when you started fooling around with him."

"I figured he'd get to be eight or nine feet long, the way most alligators do. I knew he could theoretically grow forever, but I didn't think my process was as efficient as it turned out to be."

"Well, why don't you take him off that special diet?"

"It doesn't matter," Rankin said mournfully. "His metabolism is already permanently hyped-up. If I cut out the antibiotics and nutrients now, all that would happen would be that he'd slow down a little. It would take him four years to reach twenty feet, instead of a year and a half. But that isn't much consolation. Al, what are we going to do with him?"

Mason shrugged. "As far as I can figure, all we can do is kill him. Slice him into ladies' handbags. Otherwise he'll grow us right out of house and home."

"But I'd hate to kill him, Al. He's so majestic. And it would be a dirty trick to put him to death just because he's big."

"We can't keep him here, though. He's going to take up the entire dome if we don't get rid of him. And I'd hate to think of the amount of good meat we're going to have to shovel into that huge body—"

"What are we going to *do*, Al? Can't we save him somehow?"

Mason frowned. "I wish we could, Ned. Maybe we can. Maybe I can think of something. I hope."

Luckily, Base Commander Henderson did not comment on the report Rankin turned in, which meant that he hadn't had time to read it carefully yet. Mason knew there would be yelps of outrage audible all the way to Pluto once Henderson started to read the small print and discovered that a potential dinosaur had been foisted off on him. Caligula's doom would be sealed immediately, if not sooner.

Mason had to admit privately that, once again, his fondness for fun had had grave consequences. Project Bossie, too, had started off as a gay prank, but in the end they found themselves swiping an entire labfull of equipment for their cow, at a cost of thousands. Which might have gotten Commander Henderson into serious trouble with Congress, had things not gone well.

Here, too, a pleasant jape had boomeranged. It was one thing to oblige a kid researcher by helping him keep his pet alligator; it was another thing entirely when said pet threatens to turn into a monster far beyond the capacity of the base to support. Caligula's gaping jaws already were gulping down a frightening amount of good meat every week —and, since Rankin had done his work all too well, the alligator's appetite would grow in direct proportion to his size, and then some.

For the moment, Commander Henderson was too busy getting that unmentionable telecast arranged to have time to leaf through Rankin's report. The moment he did, though, and came across the projection of Caligula's growth, he was likely to order the immediate cessation of Rankin's

experiment and the even more immediate dismemberment of the calibrated alligator. Which would be a pity, Mason thought. Caligula was too noble a creature to deserve so ignominious a fate as conversion into shoes, belts, and handbags.

Sadly, though, Mason admitted that the hopes for Caligula's survival were slim. A lunar dome has only a limited amount of space, and is definitely not designed with forty-foot alligators in mind, or even twenty-foot ones. Of manageable size now, Caligula would soon be awesome, if Rankin's growth curves were right—and, alas, they probably were.

No answer was in sight. After a couple of days of wrestling with possible solutions, Mason let the matter slip from his mind. He had to knuckle down and start preparing his lab for the forthcoming telecast. He could not worry about Caligula.

For the next month progress ground to a halt at Lunar Base Three, while plans for the telecast were being hatched. The problem of Caligula receded.

Then, one night, word came that the Russian telecast was imminent. Video sets were hastily rigged together and mounted in the Recreation sheds. The men of Lunar Base Three gathered together to see just what the comrades had to show.

The telecast was in Russian, of course. The Earthside stations who were picking up the signal for transmission to their own audiences would naturally dub in a simultaneous translation in appropriate languages, whether English, French, Turkish, or Swahili. But there was no need for a dubbing job to be done at Lunar Base Three. For the last couple of decades, it had been not only academically required, but sheer common sense as well, for any man planning to do scientific work to acquire a good working knowledge of Russian. That way, he didn't have to hope for a translation to become available, whenever some document vital to his particular specialty was published in a Russian technical journal.

The men of Base Three watched the telecast with a good deal of interest. There was little contact between the American dome and its Marxist counterpart in Ptolemaeus Crater, and nobody knew exactly what the Russians were currently working on in there. But, as it happened, their laboratories looked astonishingly like the American laboratories. The NO SMOKING signs were in Cyrillic instead of Roman characters, but the general appearance of the sections was unremarkable. Nor were the Russians up to anything *outré*.

There was a cryogenics lab, a hydroponics section, a genetics wing, an annex for solid-state work, high- and low-pressure physics lab, atmospherics, nucleonics, gravitics—all the usuals. Of course, nothing of a classified nature was going to be shown; maybe the Russians were running tests on a functional death ray in their dome too, but if they were they

would probably choose to keep it to themselves for a while longer. Nor did the straining eyes of the Base Three personnel pick up any useful hints of Soviet procedures that could be appropriated with profit.

It was sheer propaganda for the layman: "Look what an elaborate laboratory we've built here," the Russians were saying. "Look how interested we are in solving the secrets of the universe." Which was all well and good, all perfectly true. The Russian lab *was* impressive—though not a whit more so than the American.

One thing that aroused Al Mason's interest was the fact that the Russian presentation was utterly humorless. Not once did a Soviet scientist smile when demonstrating his specialty; nothing of the order of the milk-producing machine was shown, either. All was grim seriousness over in Outpost Kapitza, it seemed.

And then, as an unexpected fillip at the end, the Russians unveiled their bear.

"Here is the mascot of Outpost Kapitza," the Russian commentator declared sonorously, and the cameras focused on a rotund little bear about three feet high. "The animal is beloved of us all, here. He represents the strength and tenacity of Marxian Socialism. To us, he symbolizes the spirit of Outpost Kapitza. As a bear will cling without fear to its quarry, so, too, do we pursue our goals diligently and unshakeably—to their ultimate attainment. This has been Outpost Kapitza broadcasting. Thank you."

The telecast was over.

The consensus of opinion, radioed up from Washington the next day, was that the Russians had done a pretty good job of their presentation. It had been serious, for the most part; it had demonstrated what needed no demonstration, the fact that the Soviets were making splendid progress in just about every field of science; and, by showing the little roly-poly bear at the very end of the program, the Russians had wiped out completely the rather impersonal tone of their demonstration, and had left in its place an impression of warm humanity. After all, people who are softhearted enough to keep a furry mascot in their laboratory can't really be *evil,* can they?

The word came from the Pentagon: the American telecast, which was scheduled to follow in three weeks, had better be good, with a capital G. Public-relations experts would be coming up in the next ship to help in the preparation of the showing. America's television networks were pooling their talent to send the best directors, cameramen, and scriptwriters. Lunar Base Three's answer to the Soviets would have to be Quite A Show, or heads would roll. The undertones in the directive from Washington were distinctly sinister. To be outdone by the Russians in science might be bad enough; to be outdone in the

art of television broadcasting would be a catastrophe.

The public-relations experts, directors, cameramen, and writers duly arrived. Lunar Base Three was overrun with them. They were everywhere, jotting down notes, chalking camera angles, talking to technicians, and generally disrupting the normal work of the base.

The day of the telecast drew nearer and nearer. An air of tension hung over the base. Speeches were written, condensed, expanded, scrapped.

And somehow, in the midst of all the confusion and turmoil, Commander Henderson found time finally to leaf through the report Rankin had submitted on his growth-acceleration project.

Al Mason was supervising the uptidying of the hydroponics lab when his phone rang. He snatched it up impatiently.

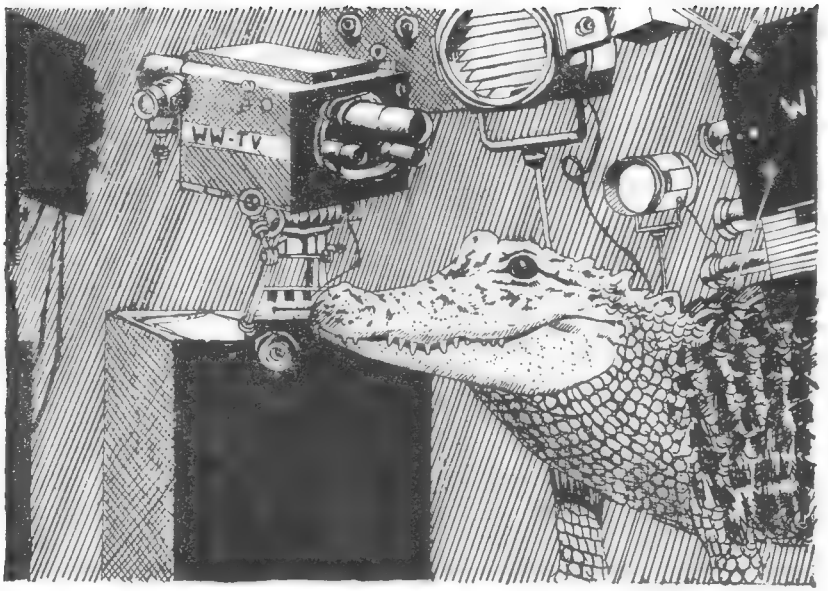
"Mason here."

"Al, this is Ned Rankin. The explosion has come."

"Huh? What—"

"Henderson! He finally read my report. He called me up two minutes ago and said to me, 'Are you serious when you say that this alligator is going to grow to be forty feet long?' So I said yes, and he started to gargle and choke, and finally he told me to get over to his office on the double and give him an explanation. Heck, Al, what am I supposed to tell him?"

Mason ran his tongue nervously



over his lips. "Let me do the talking. Meet me in front of the Administration hut and I'll go in there with you."

Commander Henderson's usually uncluttered desk was piled high with memoranda about the forthcoming telecast. But he was holding a familiar-looking portfolio gripped tightly in both hands, and the expression on his face was not a benign one

It became even more stormy when Mason walked into his office along with Ned Rankin.

"What are *you* doing here, Mason? I asked to see Rankin, not the whole base in here."

"Well, sir," Rankin began tremulously. "He—"

"I happen to be involved somewhat in this alligator thing, sir," Mason said calmly.

Henderson's eyebrows rose half an inch. "You? Aren't you busy enough with your hydroponics and your cow? Do you have to be mixed up in *every* bit of whackiness that goes on up here? Just how are you involved in this, Mason."

"I . ah . . . was responsible for persuading Dr. Rankin to undertake the project. He was a little hesitant, you see, so I prodded him."

"And it's noble of you to step forth and admit that now, I guess," Henderson said icily. He glared upward from the portfolio. "I read in this report of Rankin's that you expect Caligula, or whatever you call him, to reach a length of twenty feet some time in 1998, and that eventually he's going to be forty feet long. Where, may I ask, did you plan to keep a forty-foot alligator? Where would you even keep a *twenty*-foot alligator? Do you do these things *deliberately*, Mason?"

Mason smiled thinly. "He *is* going to be rather large, isn't he, sir?"

"Yes. He is. And one more thing." Henderson transfixed them both with malevolent glares. "I have no recollection of O.K.'ing any requisitions for alligators, despite the evidence in the files of the Requisitions clerk. I don't remember receiving either a formal or an informal request to carry on this project, either, Rankin. All I knew was that one day it was a *fait accompli*—there was a yard and a half of alligator living in a tank in your lab, and I was supposed to have O.K.'d it some time in the misty past. That made me suspicious. So I went to the rather violent extreme of phoning Earthside and having them check cargo manifests for the entire year of 1996. There wasn't a single reference to the shipping of a single blasted alligator. Now, isn't that odd? Mason, you're probably responsible, so why don't you tell me where that beast came from in the first place? Was he spontaneously generated? Did he stow away on a cargo ship? Did you find him crawling on the naked face of the Moon? Is he a Russian spy? Where did he come from, anyway?"

Mason gulped. A bead of sweat dribbled down his forehead. He thought of Cryogenics Technician Ross furtively collecting snips of

meat for his tiny pet. No point getting Ross in trouble on account of this. He would be leaving the Moon at the end of the year anyway, having used up his grant.

In a strained voice Mason said, "Sir, let's be practical about this. The real problem now isn't where the alligator came from, but what we're going to do with him."

Henderson nodded agreeably. "O.K. For the moment, we'll overlook the question of origin. I'm even willing to let it be overlooked permanently. Just tell me what you plan to do with this monster that you and Rankin have been nurturing?"

Rankin said feebly, "Why, the experiment will be terminated, and I guess the alligator will have to be destroyed—"

*"Destroyed?"* Mason shrieked. "Destroy a tangible proof of our accomplishment at Lunar Base Three?" Wheels were turning in his head, suddenly. "We can't destroy Caligula, Rankin. He's our Exhibit A."

Henderson rose to his full height and glared at the hydroponics technician. "Would you mind telling me what you're babbling about, Mason?"

"Certainly, sir. But first—have you read Rankin's report in detail? About the value of the application of his process to herbivorous reptiles, as a new and economical food source?"

"Yes, but—"

"Rankin didn't see fit to go into the details, but it's obvious that the growth acceleration treatment has tremendous value to the people of Earth as well as the inhabitants of the Moon bases. And anything which has food value to Earth has tremendous propaganda value, too."

"So?"

"The Russians showed their pet bear, didn't they? Well, on *our* telecast, we can show our alligator. And explain just how old he is, and why he happens to be so big for his age. And what he means to the Moon and to Earth in terms of unlocking an enormous new source of cheap food. It'll be a propaganda coup, sir!"

"But that still doesn't tell me what we're going to do with that monster up here," Commander Henderson objected.

Mason smiled. "Oh, we won't keep him here, sir. He'll be famous after the telecast. We'll send him back to Earth, where everyone can see him. He can be a visible demonstration of the Rankin Process. An alligator on Earth is worth ten on the Moon, sir."

Rankin frowned. "But the cost of shipping—"

*"What* cost?" Mason demanded. "The big budget item is fuel to get stuff from Earth to here; it isn't more than a tiny fraction as expensive to send things in the other direction. And there's always plenty of room on the cargo ships when they leave for their return leg to Earth. Room enough for Caligula, at any rate."

He stopped. The commander was smiling. After one doubtful moment, Rankin started to smile, too, and then all three began to laugh.

Lunar Base Three's telecast was a great success, carried off with the skill and professionalism that all had hoped for. Commander Henderson himself narrated it. Cameras were set up all over the base, and the scene shifted rapidly from one laboratory to the other, with each department head explaining briefly and within security limitations what he was working on. Commander Henderson provided a commentary to bridge each separate talk, and he handled himself ably.

A high-point of the screening was the visit to Room 106A, which contained Project Bossie. Al Mason discussed in some considerable detail how the milk-synthesizer functioned, and capped the demonstration by gulping a pint of Bossie-produced milk with evident delight.

And finally, after each of the research wings of Lunar Base Three had had its televised moment of glory, the cameras shifted to a room in the biology laboratory. All extraneous calibrating equipment had been cleared away from Caligula's tank, leaving the alligator—now a full five feet in length—exposed to full view.

As Caligula peered majestically into the lens of the camera, Commander Henderson's voice delivered a sonorous peroration.

"We come now to the conclusion of our tour of Lunar Base Three. And on your screen now is *our* mascot—Caligula. Born in Florida's Everglades, he has spent his entire adult life in Lunar Base Three, floating here in proud majesty. Not a man of our staff fails to admire Caligula's lofty bearing and regal poise. To us, he represents a link with the past ages of Earth's history. Unchanged over millions of years, the alligator has come down to us out of the dim mists of the Mezozoic. Here on the Moon, he serves to remind us of how short a span of time the era of man has actually covered—not even a visible fraction of the eons that alligators have inhabited the Earth. And yet, in our few centuries of existence, we have dared to fling our gauntlet outward, to the stars. Who knows what mankind will accomplish, by the time our race is as old as Caligula's now is?"

The commander paused. Then, descending from the flowery heights of oratory, he added in a less resounding tone, "But Caligula is not only a pet here. He is an experimental animal as well—and the experiment he has taken part in will have incalculable benefit for you, the people of the Earth."

The camera panned to Ned Rankin, who was standing behind Caligula's tank.

Commander Henderson said, "Here is Dr. Rankin of our Biology staff, who will explain Caligula's importance to humanity."

Ned Rankin grinned good-naturedly and said, "Caligula, you see, is the prototype for a new breed of reptile—a reptile that grows to a great size in a short period of time. Not much more than a year ago, Caligula was just a ten-inch alligatorlet." He

indicated the size with his hands. "If left to develop normally, he'd be about a foot and a half long, now. Instead, he's reached a length of five feet, and will continue growing until he is of truly enormous size—perhaps as much as forty feet.

"This phenomenal growth has been achieved through special techniques developed at Lunar Base Three. You may wonder, what is so important about having grown a huge alligator?" Rankin smiled. "The importance, ladies and gentlemen of Earth, is that this process can be applied to reptiles such as the iguana, whose meat is considered a delicacy nowadays. An enormous new supply of food—meat—is now available to mankind.

"It'll be a few years, of course, before the first iguana meat reaches your dinner table. But this particular development of Lunar Base Three will help to insure that there will be no more Meatless Tuesdays that you have had to endure lately. Growing faster than cattle, requiring far less care, just as nutritious—you see the multiplicity of advantages that this new development will have. An Earth confronted with a critical shortage of meat has been reprieved. The great problem of the century to come has been alleviated."

The camera took in Caligula once again. Commander Henderson spoke again. "Thank you, Ned Rankin, for your explanation—and the whole world thanks you for the process you have developed. And, ladies and gentlemen, I'd like to add here that very soon you will be able to view Caligula with your own eyes. Yes, we have decided to send him to Earth. By special arrangements just concluded before we took the air, Caligula will be shipped to Earth for exhibition at the major zoological gardens of the world. We'll miss him here, but we send him to you as visible proof of our work at Lunar Base Three. And as he grows to giant size, he'll serve as a reminder that the men of Lunar Base Three never cease in their endeavor to improve the welfare of humanity.

"Thank you, and good night from Lunar Base Three."

The telecast, having been relayed by orbital pickups round the world, had been viewed by an estimated two billion people. And the reverberations from Washington the next day were loud and approving.

In Commander Henderson's office, the commander said to Al Mason and Ned Rankin, "The wire is flooded with congratulations on our telecast. There's talk in Congress of doubling our appropriation. Everybody's buzzing about Caligula, and the zoos are squabbling for the right to be the first to show him."

"They'd better have a big tank ready," Mason said. "And plenty of raw meat."

"The iguana business really has everyone standing on their heads, though," the commander went on. "The Government was planning to announce tougher meat rationing next year, and they were worried

about the effect it would have on the elections. But now they're cancelling the new restrictions, pending the introduction of iguana farming. You'd better get started on a full, detailed report. They're ready to get into iguana production down there the moment you give the word."

"We'll need some up here, too," Rankin said. "My computations show that six pairs of iguanas, if treated with my process, will grow and reproduce fast enough so that after six months they'll be producing enough meat to supply the entire base twice a week. Which means a good many tons of scientific equipment that can be shipped up here each month instead of that execrable synthetic meat. The iguana supply is not only self-replenishing but will require a minimum of food and care in return for a maximum of edible meat."

"Not to mention the important factor of introducing some variety into our diet," Mason added.

"The ship is leaving next week," Henderson said. "With Caligula on board. And it'll bring your iguanas on the return trip."

"Poor old Caligula," Rankin said. "I'm going to miss him, I'm afraid."

"We just aren't set up for raising monsters up here, Ned," said Mason. "Another few years and we would have had to build a special dome just for him. Down on Earth, he can grow to forty or fifty feet in peace—and every yard he grows is another feather in our cap."

Commander Henderson nodded. "It's a great achievement all around. And you've pulled a silk purse out of a sow's ear again, eh, Mason?"

"It wasn't my doing, sir. Rankin invented the process. I simply aided in a minor sort of way."

"That isn't true, sir!" Rankin blurted. "If it weren't for Mason, we would never—"

Mason kicked him sharply. Rankin shrugged and shut up. Commander Henderson fixed them both with a steely gaze. "There's just one thing bothering me about this whole project," he said. "I've been meaning to ask you: if the point of it was to accelerate the growth of herbivorous reptiles, how come you started with an *alligator?*"

"Well, sir," Rankin began.

"It's sort of complicated, sir," Mason interrupted. "It's a long story that isn't really worth the time it would take to tell it."

Commander Henderson sighed. "The translation being that you were up to something you shouldn't have been up to. Oh, well, Mason. I know when I'm licked. I won't push you any harder on the subject of where that alligator came from in the first place. It doesn't really matter, now. Not in view of the results." He picked up a piece of paper. "I just wish I had some way of knowing what you'll be up to next," he said wistfully. "No, cancel that. Life would be a lot duller up here if I did."

THE END

# COLOR VISION...

## THE LAND EXPERIMENTS

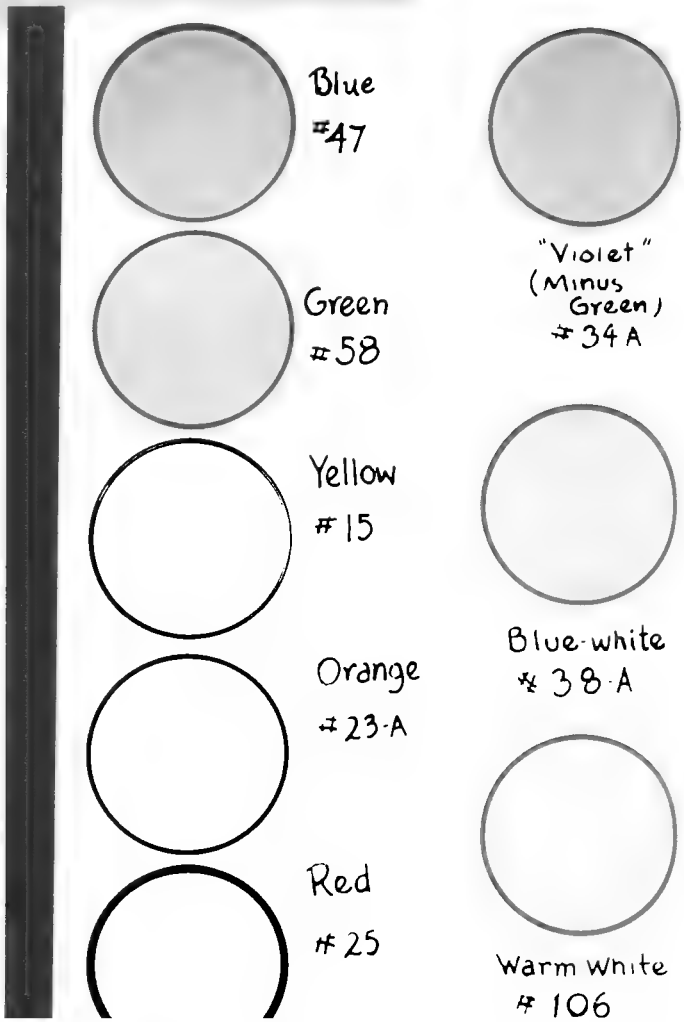
By **JOHN W. CAMPBELL, Jr.**

***The Land experiments in color do not, as yet, constitute a process of color photography—but they are crucial experiments, in the strict technical sense, showing definitely the inadequacy of present color-vision theory.***

THE domestic scene on our new cover does not indicate that we plan to abandon the laboratory for the sewing room; it represents a test-setup for study of color vision. And about the best accessible scene within the terms of Dr. Edwin Land's color-vision discoveries.

In Dr. Land's article in the May, 1959 *Scientific American*, "Experiments In Color Vision," he pointed out that human eyes were evolved to

In each shot, glass-mounted gelatin filters are laid out on a sheet of opal plastic, illuminated from behind by four 20-watt fluorescent "daylight" white tubes. The various filter colors are named, and the Wratten number of each given. One shot was taken with white light—i. e., with no filter over the camera lens; each of the others was taken through that filter which is missing from the series. The filter that isn't in the picture, in other words, is on the camera lens. The approximate color-appearance of each filter is shown on the cover.



function in a natural environment, and that, therefore, the standard, simplified tests of a colored spot against a colored surround were not appropriate to the human mechanism. We didn't evolve eyes to observe an orange moon rising in a dark blue sky, but to detect camouflaged leopards hiding in dappled shade, or to detect plump game birds artfully disguised to look like a stray rock in the field.

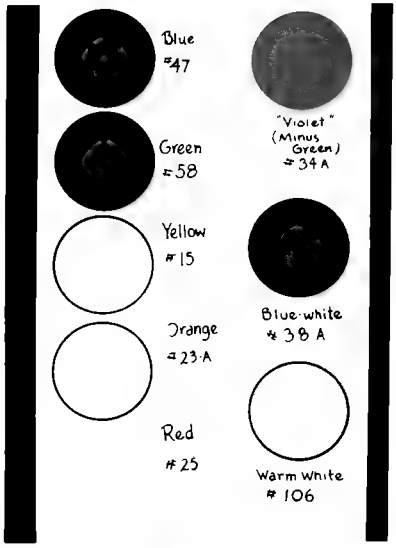
The proper test for human color vision, then, is a scene that, like the natural scenes we evolved in, has highly complex forms, and highly complex and diversified color the kind of scenes our eyes are actually called on to resolve in daily living.

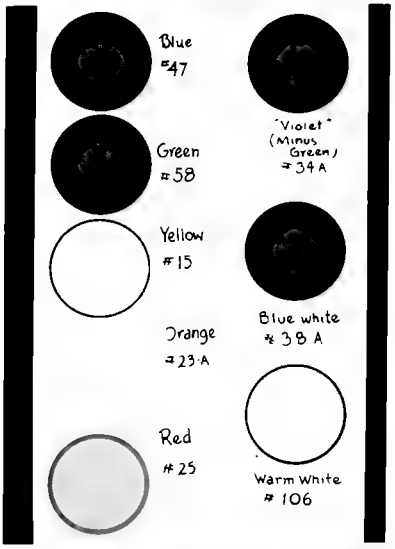
For the purposes of making tests, however, a highly reproducible scene is needed and for practical camera work, a scene which is a really *still* still-life. Flowers would be the obvious natural-scene-color—but cut-flowers fade and are not reproducible, while outdoor scenes wriggle, shimmy, and shake when breezes blow. This makes exact duplication more than somewhat difficult.

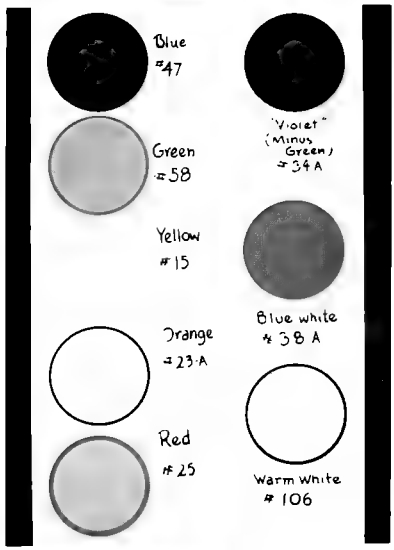
The sewing-table scene makes a "natural situation" picture in which the whole rainbow of colors quite normally occurs. It will, moreover, hold exactly still for weeks at a time

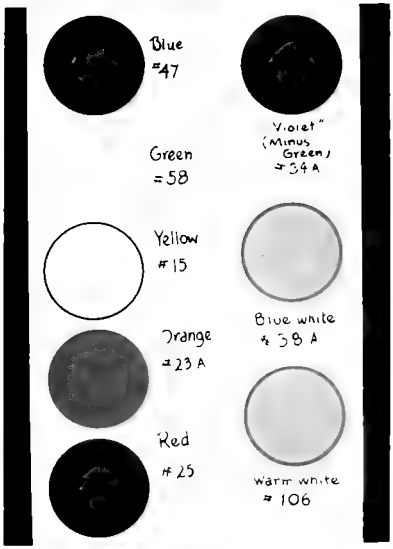
provided it isn't a genuinely-in-use sewing-table scene! As of now, I have a very extensive collection of negatives of this particular sewing-table scene.

The spots-with-surround picture, on the other hand, is decidedly not






a Land-system test. It is for a different purpose. It is, moreover, far more a work of art than a work of technology—the engraver's art. The red, orange, yellow, and green spots were produced photographically; the blue and "violet" spots are strictly synthetic—carved out by hands using the engraver's tools.

Eastman Kodak's Kodachrome film is the best of the color films available for 35 mm cameras for sharp definition, complete lack of grain, and color saturation. It's based on the three-color system of color reproduction, and does a highly satisfactory job, as several million users all over the planet can testify. It's good. The sewing-table scene on the cover was reproduced from a 35 mm Kodachrome. (Daylight type, with 80B correction filter under photoflood illumination.)

But the colored-spots setup consists of a series of Kodak's Wratten filters—sheets of dyed gelatin between clear glass, mounted in metal rings. These are Series VII size. They've been laid out on a light-box consisting of white opal plastic over four 20-watt fluorescent daylight-white tubes. (Agreed; "daylight white" fluorescent tubes do not match perfectly the color of natural sunlight; the color balance is not perfect for Kodachrome Daylight. But the imbalance is minor.) And this scene the Kodachrome flubbed completely. I took an extensive series of shots, ranging from theoretically-correct to 8X "correct" and down to 1/8th "correct." None of them reproduced the

colors properly; if the blue-violet filters showed decently, the red-orange filters came out pink-white. When the red-orange showed, the blue-violets came out black.

Kodachrome, Ektachrome, Anscochrome—it makes no difference; none of them can handle that problem.

But the human eye does—beautifully.

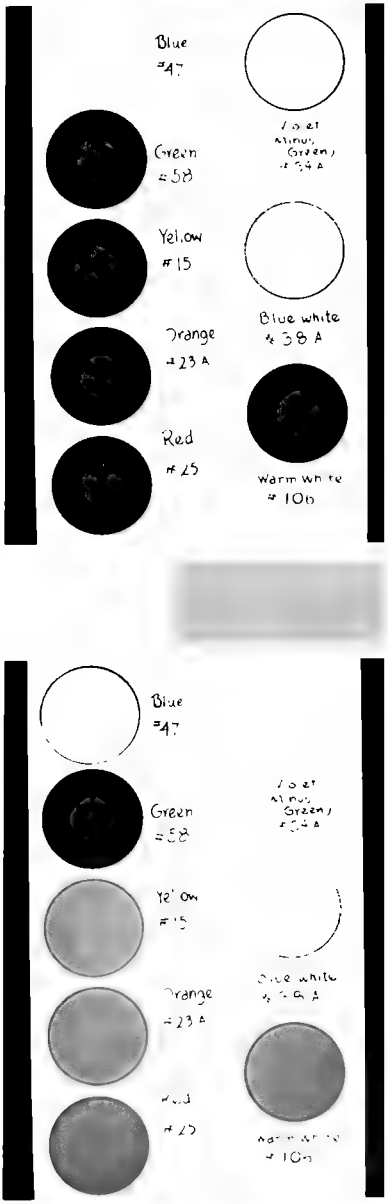
If you've ever tried taking color shots of Christmas lighting displays, you've run into the same basic problem; an exposure adequate to allow the blue and green bulbs to record color will make the yellow and red bulbs show as white or washed-out pink.

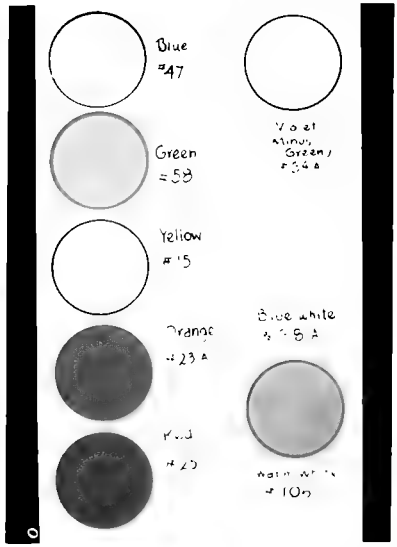
That problem is simply one of insufficient latitude of exposure.

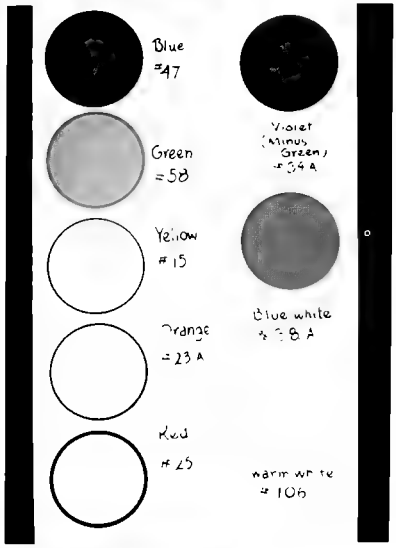
Yes . . . but the thing can also be stated as "In order to get color reproduction, the slope of the curve of color-response built into the film must be so steep that there is no great latitude of color-response." The lack of latitude, in other words, is *inherent in the method* of recording the color scene.

The purpose of the cover shots, however, is primarily to act as keys to the black-and-white reproductions on the accompanying pages. These were tests based on Land's experiments, plus some further exploring of my own.

If you haven't read Dr. Land's *Scientific American* article, it's strongly recommended. It's a major-breakthrough article that will, in the






future, be recognized as one of the pivot-points of the history of science. Other men had observed earlier that color effects could be obtained by projecting black-and-white images in red and in white light. But Dr. Land's group was the first to study that phenomenon on a really thorough basis. Land discovered that a black-and-white transparency produced by exposure through a red filter (and called a "long record," since it recorded the long wave lengths of visible light) could be projected in register with a similar transparency of a "short record" (produced by the shorter wave lengths of green light), and, on the screen, human beings saw not only red and white, but all colors. But then Land, unlike his predecessors, went much further; he had a dual monochromator built, and projected the transparencies with true, spectrally-pure monochromatic light.

So long as red and white light was used, it could be argued — however feebly! — that, after all, all colors actually *were* present on the screen.

With the dual monochromator projector, the red light was red-and-nothing-but-red, and the green light projection was green-and-nothing-but-green.

Human beings still saw all colors.

In fact, the long record could be projected with a slightly orange-yellow part of the spectrum, and the short record with a pure-yellow band . . . and human beings *still* saw all colors!

How much it cost Land to hand-tool a pair of high-wattage monochromators competent to project adequate transparencies on a screen I wouldn't know. If he got them for less than the cost of a pair of Lincoln Continentals, he's a canny buyer indeed. I didn't bother pricing such equipment myself for my experiments; I settled for something less effective—the series of Wratten filters. (Series VII filters not only fit the Nikon F lens, and the Nikon S3 105 mm lens; they also fit nicely—with Scotch Tape—the lens of the Argus slide projectors.) I have not been able to repeat Land's momonochromator experiments; I'll take his word for those results, because to the extent I've been able to check, he's right.

A pair of transparencies produced from red and green filtered shots, projected through green (for the red) and blue (for the green) filters produces an impression of color on the screen which, while by no means high-fidelity color, definitely suggests red, orange and yellow—which definitely isn't present on the screen. So long as the long-record shot is projected with light of wave length longer than that used for projecting the short-record shot, the color-effect on the screen at least strongly suggests to a human viewer the correct color-relationships.

The series of black-and-white prints accompanying this text were made with the Wratten filters shown on the light-box. In the light-box series, the filter that is *not* on the light-box *is* on the camera; the series shows the scene as viewed by white light (no filter on camera, Panatomic X panchromatic film in the camera), and then seen through each filter in turn.

Corresponding shots of the sewing-table test-scene were made through each of the filters (except the orange); these were indexed by putting the label in the picture, the one practical way of making certain there would be no mislabeling possible. Grease pencil on standard file cards works fine. No file-card label in the picture means no filter on the camera.

Making the Land-experiment shots is not particularly difficult; anyone with a home darkroom can do it readily. Either 35 mm or cameras using 120 or 127 size film can yield transparencies that can be projected in the fairly readily available 35 mm slide projectors. (It takes two; yours and your neighbor's!)

There are a lot of variables to explore and the field is almost one hundred per cent Terra Incognita; the fascinating thing about exploring it is that you keep discovering things we didn't know . . . when we thought we did. The first steps, duplicating the original Land experiments, are easy:

Two black-and-white negatives are exposed; one through the Wratten #25 red filter, the other through the Wratten #58 green filter. These are the red-green pair of the old-standby three-color separation trio, the third

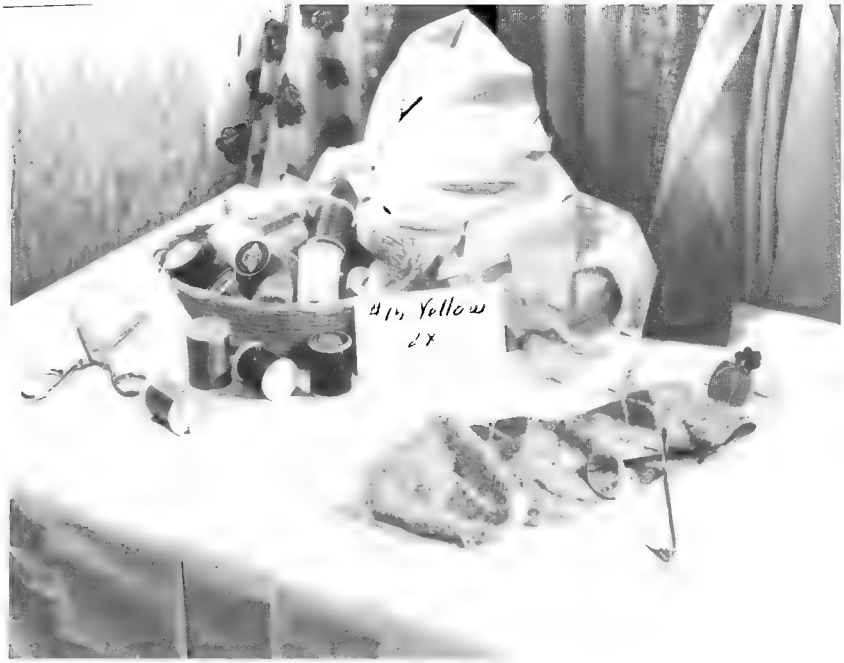
One shot shows the white-light appearance of the scene as perceived by standard panchromatic film; the filtered shots are identified by the white file card included in each. (The one sure way of indexing your shots so they can't be misidentified later!) Compare with the three-color reproduction on the cover, and with the filter-series. Kodachrome does an excellent job of reproducing this kind of colorful scene; it's only the pure-color scenes such as the filter-series that throws it for a loss.

being the Wratten #47 blue filter. I used Panatomic X, in a Nikon F, with the 105 mm lens for the black-and-whites on these pages. (The cover was taken with Kodachrome in a Nikon S3 with 105 mm lens.) You want *all* the shadow areas, so give generous exposures; rate Panatomic not higher than ASA 20. Remember that, for this work, a piece of red material comes out as a "dense shadow area" for the green-filter shot, since the green filter cuts out red completely. No matter how much in a high light that red material is . . . for the green-filtered shot, it acts like a dense shadow area.

If you plan on making any number of experiments—buy a fifty-foot roll of bulk film, and load your own cartridges with extra-short lengths—ten exposure or so.

Development is normal; I used four minutes at 70° in UFG developer.

The transparencies seem to work best if made on Fine Grain Positive film, and developed about two minutes in Dektol. Fine Grain Positive is intended for making transparencies, and can be handled under regular yellow-green darkroom safelights such as are used for enlarging-paper work. Experimenting with the effect of contrast can much more easily be done with the transparency work than with the negative film; you can do the developing under a fairly adequate yellow-green light and see what's going on.



The transparencies must not be thin; to get the Land color effect requires that there be a ratio between the long-record and the short-record at *every point* of the screen. An area in the transparency that is perfectly clear—no effective exposure—has zero control over the light passing through it. And you can't get a ratio with zero! Normally, "good" transparencies should have perfectly clear, clean high lights; for the Land experiments, make "poor" transparencies. They should be somewhat gray everywhere, with no clear high lights. But, since black (total absorption of the projector light) is also "zero control," the deepest shadow area must be kept somewhat transparent—which means that the contrast must not be allowed to go too high.

Your first tries will, almost certainly, yield results that will establish for you that something very definitely not in the older books about color vision is going on. If you get perfect success, you're more than lucky, but a complete flop is almost equally improbable.

At that point, you're ready to launch off into the really wild unknown—for what Dr. Land has done is one of those very rare feats of scientific accomplishment that aren't very frequently discussed in detail. Many men have stated their desire to "add to the store of Man's knowledge." Dr. Land has succeeded in subtracting from the store of man's

nonsense. He hasn't really added anything to our knowledge; he's simply swept a whole shelf of books about the nature of color off the storehouse shelves, and put a large sign RESERVED FOR FURTHER INVESTIGATION in their place. The removed material is being re-catalogued for storage along with the textbooks on Phlogiston, Ptolemaic astronomy, and Alchemy.

Here's an area where you can try in your home workshop experiments that have *not* been done a thousand times before with better equipment. The basic patents for real color photography *have not been issued!* We just thought they had!

Doing this article has been quite a job; I thought I was ready three months ago. I'd done a series of Land experiments, and gotten some help from a man who, because he was partially colorblind, could give me clues that I'd never have been able to discover. One of the sets of pictures I had ready to publish was a shot of a true spectrum—the real, physical spectrum, not a painted "spectrum." That distinction is *very* important!

You see, the Land process flubs completely on the spectrum; a color-photograph problem that seems, at first thought, like the very simplest of all tests proves to be one that the Land process can't handle at all. Projecting the long and short records gives nothing but a black-and-pink wash over the whole screen, with just a narrow area of yellowish color just off center.

I was all set to use that shot—

with the Kodachrome shot of the spectrum for comparison--until I got the Kodachromes back.

Did you realize that Kodachrome can't handle a spectrum either? Actually, *no known color photography process can reproduce a spectrum.* Oh, Kodachrome, Ektachrome, Anscochrome—any of the color films—will do fine on an artist's painting of a spectrum. But on a true, physical spectrum from a spectroscope they fail egregiously.

Considerably more research and thinking was called for. And the real nature of the problem of color photography came into sight.

To understand it clearly, it must be expressed in rock-bottom-basic terms. What are we seeking to do?

*We want a process of reproducing the experience of seeing.*

Defining the problem in those terms is necessary; to do so, however, makes a large number of totally new avenues of approach available. For example, "color" is a *subjective experience:* the experience is normally--but not necessarily!—excited optically. A blow on the head can produce the experience of seeing colored lights; that's a genuine experience-of-seeing produced by a nonoptical method. Mild electrical shocks can produce color-experience, also nonoptically. As science-fictioneers, we can consider the possibility of some variety of brain-wave gadget that would directly induce in the mind of the "viewer" the experience-of-seeing in full color and form without any optical stimulus.

If such a recording-and-playback device were perfected, wouldn't it in

fact accomplish precisely what we intend to accomplish by photographic means? Television shows were, for a time, recorded from the picture tube onto photographic film, then played back from the photographic images. The substitution of magnetic tape recording completely by-passes the optical recording link—and accomplishes what the photographic method was intended to accomplish.

Now human-subjective color does *not* equate to what a physicist is discussing when he talks about "light of wave lengths between four hundred and seven hundred millimicrons." The physicist may say that "light around seven hundred millimicrons is red, while that near four hundred millimicrons is near the limit of the visible violet," but the statement is not precisely valid.

For example, there is no wave length that corresponds to the visual-subjective color purple. There is no part of the spectrum that is brown. An individual who has suffered from cataract, and had the lenses of his eyes surgically removed, can see well out into the "ultraviolet" beyond four hundred millimicrons. People with black or brown eyes normally do not see as far into the short-wave region as do young, blue-eyed blondes.

It is strictly, in exact terms, *false* to state that "The colors we see correspond to different wave lengths of light." Light longer than seven hundred millimicrons is verging into the

infrared; at the limit of your vision toward the long wave lengths, the visual effect is purple.

At the opposite extreme, where light is verging into the invisible ultraviolet, the most extreme visual violet is also purple.

Wave lengths are linear; they march in a series starting with kilometers, and diminishing steadily to micro-micromillimeters. But the human visual system sees things in a nonlinear manner—it loops back on itself so that "purple" is the completely ambiguous sensation produced by either extreme red or extreme violet. It's the visual sensation "End of the line!" It doesn't say which end.

So we have this: Color is a subjective phenomenon, and the experience-of-seeing could, theoretically, be produced by completely nonoptical methods. The experience is normally induced by reaction to electromagnetic radiation lying between four hundred and seven hundred millimicrons, but can be induced by mechanical or electrical shock.

Land's color-vision experiments have shown something entirely different and entirely new; the experience of seeing red can be induced by interaction of yellow-orange and yellow light. It can be induced by electromagnetic radiation in a completely anomalous manner.

However human color-vision does work, it does *not* work in the manner physicists and physiologists have believed.

The physicists have been more acutely conscious of the invalidity of the "wave-length-is-color" correlation than any other group, and for some time. The physicists long since gave up measuring color by eye, and went to various physical measuring devices. The bolometer and the spectroscope were the fundamental devices.

The bolometer measures radiant energy by absorbing it and measuring the heat produced. Any form of radiant energy, regardless of its form, can be absorbed and converted to heat; once converted to heat, all forms can be accurately compared. The bolometer is totally insensitive to color; it works as happily with infrared as with X rays—provided only the X rays are wholly absorbed.

The spectroscope allows accurate measurement of wave length.

The two instruments, as a team, can plot the energy-content at any narrow band of wave lengths.

Photoelectric cells are much easier to use; they aren't equally sensitive to all wave lengths, but accurate correction charts can be made using bolometer comparisons. Then we have the spectrophotometer; it can read the exact energy-content of each narrow slice of wave lengths across the entire spectrum. With this device, absolutely accurate color-matching is possible.

Except for one thing; the answers that system gets will always look right to human eyes . . . but there are matches that look perfect to human eyes that the spectrophotometer says

aren't even remotely similar! There's a mixture of red and blue, for instance, that matches a particular violet to human vision. The spectrophotometer correctly reports that the two aren't even vaguely similar.

Now who's a liar? The human eye or the spectrophotometer?

If you're talking about the experience-of-seeing-color, the spectrophotometer is. Not, perhaps, a liar —just abysmally stupid. It can't see that blue-plus-red is, in an important respect, identical to violet.

Take an oscillogram recording of the sound-waves produced by a ten-year-old Southern girl saying, "I want to go home," and an oscillogram of a tipsy New York longshoreman with a bad cold saying, "I want to go home." The oscillograms bear no perceptible similarity, in either average frequency, phase-distribution, harmonic content or the like. Yet one of the most immensely important facts in the world is that the two entirely different sound-wave systems are, in a crucially important respect, identical. Both—as any human being can clearly recognize—carry the same message.

That's where the spectrophotometer flubs; it can't recognize the similarity of color-message in red-plus-blue and pure violet.

Some yellow pigments show, under spectrophotometer analysis, just about what you'd expect—relatively low reflectance in the other areas of the spectrum, and a relatively high peak of reflectance in the yellow. But on the other hand, chrome yellow reflects all colors very well, except for the blue region;it absorbs heavily in that range. So chrome yellow isn't yellow—it's white-minus-blue.

The "violet" filter on the light-box is, technically, a magenta filter —and magenta is defined as a minus-green. It's violet in terms of normal color-naming, because it's a red-plus-blue filter. Note that it appears fairly transparent both in the red-filtered shot and in the blue-filtered shot among the black-and-white prints. In color photography, it became important to talk about the minus colors —magenta (minus-green), cyan (minus-red, which appears bluish to the eye), and yellow, which is minus-blue, since it transmits both red and green.

The efforts toward color photography on the three-color process run into difficulties when they hit pure colors. They manage very well in nearly all normal situations, because most of the things they're called on to reproduce are scenes made up of colored pigments—and pigments, practically without exception, are mostly-white-with-extra color, or white - minus - one - color — and the white part of the reflected light saves the day for the color film.

Kodachrome, like any other three-color film, is totally incompetent to reproduce a spectrum because there the film is called on to deal with pure, no-white-about-it colors.

The color-films all use the same basic method of color-analysis. The first layer of the film's multi-layer

structure is a straight silver-halide emulsion; silver salts respond to the upper end of the spectrum only. They're insensitive to red, yellow, or green, unless some organic dye sensitizer is added. So the top layer of the emulsion reacts only to the blue, blue-violet, violet, and ultraviolet part of the spectrum.

Immediately under it is a layer of yellow filter-dye; it's effectively opaque to the upper end of the spectrum, and transmits only the green and red.

The second sensitive layer, then, is exposed only to the green-through-red component of the light; it's composed of silver halide plus a green-light sensitizer. This layer then records only the green component of the light; it's not sensitive to red, and the blue can't reach it.

The third sensitive layer is silver halide plus a red-light sensitizer; it responds to the red component of the scene only.

When the film is processed, each layer is dyed with a dye corresponding to the sensitivity of that layer. Necessarily, be it noted, *one* dye for each layer.

Now consider what happens when we take a color shot of a spectrum. The upper end of the spectrum records on the top emulsion layer—*all* the upper end of the spectrum. The blue, blue-violet, violet, and ultraviolet alike, all record as one in the blue layer. None of them records at all in the green or red layers, because they can't pass the yellow-dye filter. When the film is processed, the blue layer is dyed with a single dye; inevitably it reproduces the entire range from blue to and through the ultraviolet as a pretty, uniform blue.

The effect isn't quite as spectacularly inappropriate in the red end, but the result's the same; all the entire range of reds is reproduced as a single red. (And the color films don't reach as far down into the long wave lengths as human vision, incidentally; the visual-extinction mark on a projected spectrum shows, on the color-photograph transparency, considerably beyond the furthest extent of the red image.)

Clearly, the three-color film system can never reproduce the spectrum as it appears to human eyes.

Now if an artist paints the spectrum, and we take a photograph of that, it will show a beautiful range of tones from deep red through green, blue, blue-violet, and violet . . . and won't show ultraviolet, because the artist didn't paint that in. This color picture matches what the human eye saw in the artist's painting. How come? Because the artist's pigments weren't pure colors; they were all modified-whites. The violet area in his painted spectrum was made up of blue-plus-red, and the film reproduces it as blue-plus-red, which looks violet on the screen.

The reason the Land process flubs the spectrum problem so completely is simple to understand; the Land effect appears only where *both* the long and short records contribute information. The red-filtered long-record shot sees green, blue, violet,

and ultraviolet alike as black—no information. The green-filtered short-record sees red, blue, violet and ultraviolet as black—no information. The only area where there is information from both records is in the yellow, where both the red and the green filters pass part of the light; therefore only the yellow region shows any Land color effect.

The effect is quite clearly visible in the black-and-white prints of the filters; the yellow filter is the only one of the pure-color filters that is not black to either the red or the green filtered shots.

The Kodachrome shot of the filters had the same kind of trouble; the pure-color filters don't record in more than one layer, and hence make it impossible for the film to approximate them by balancing two or more color-layers. The green filter doesn't affect either the red or the blue layer, and the result is not the green color of the filter, but the color of the dye used in the film's green sensitive layer. That's why the color reproduction of the filters on the cover is ninety per cent a work of art, and only about ten per cent color photography. The hand of Man had to step in, as it were.

The problem remains; to reproduce the experience of seeing. If we could record telepathic impulses, we wouldn't need optical and photosensitive devices. Since we can't use that approach—what physical methods can we use?

The problem of high-fidelity sound recording is an exactly comparable one; to reproduce the experience of hearing.

When the first real efforts toward mechanical reproduction of music at home were made, they did not take the direction of phonographic recordings. The player piano came first.

The player piano was, in a strict sense, a mechanical device for reproducing music at home; the contemporary equivalent of the "juke box" at that period was a combination of player piano, player violin and player traps, all controlled by the same punched-tape mechanism, and playing in concert.

This was an effort toward the Prime Goal; to reproduce the experience of hearing music played. But the approach was along the line of reproducing the *playing* of music.

(Be it noted that this approach would permit the ultimate in hi-fi reproduction of a piano solo; it wouldn't be a simulation of piano playing—it would *be* piano playing.)

The difficulty with that approach is, of course, obvious; you'd need one hundred twenty player-instruments to play your favorite hi-fi recording of a major symphony. (And two hours spent tuning up the one hundred twenty instruments each time.)

This more or less corresponds with the spectrophotometer approach to color reproduction; if you reproduce exactly the light-energy distribution that occurred in the original, you will, necessarily, reproduce the color appearance of the original. And a one-hundred-twenty-piece symphony

orchestra sounds just like a one-hundred-twenty-piece symphony orchestra. The way to duplicate the color of a mercury-vapor arc lamp is to use a mercury-vapor arc lamp of course. To reproduce a night picture of New York's Times Square, we'd need quite a collection of mercury, tungsten, fluorescent, neon, argon, helium, krypton, and glass-filtered lamps, if we attempted the spectrophotometer approach.

The Edison phonograph broke away from the reproduce-the-playing approach, and started down the reproduce-the-hearing line of development. Instead of trying to move the orchestra into the home, the phonograph sought to move a substitute-ear into the concert hall.

Unfortunately, the first phonographs represented the listener's ear with a tin ear that was both partly tone-deaf and hard-of-hearing into the bargain. If you're going to get results that satisfy, the substitute ear must be able to hear the same way the human ear does.

If we're to move a substitute eye in to see the scene, that eye must see the same way ours does. No substitute eye yet developed does; the result is that there is a great deal of art required to get even reasonably good color reproduction. The illumination must have just the right color-temperature, or the color film sees the scene wildly different. Pure colors it doesn't reproduce in a remotely satisfactory fashion.

The essential trouble can be expressed in one statement: both the eye and the camera necessarily encode the color information—and they don't use the same encoding system.

Land's color-vision experiments, for the first time make it glaringly clear that the eye does not *record* color—it *encodes* it. The fact that orange-yellow and yellow projetctions of his long and short records can yield the subjective-color effect is clear evidence that we are not dealing with a simple measuring-and-reporting system, but with an encoding-and-decoding system. Evidently the eye encodes color in terms of long and short wave lengths somehow, and interprets the information in these terms. As long as the long-record is projected in longer-than-the-other wave lengths, the decoding mechanism decodes it as a long record—which makes it possible for green light to "count as" red light.

The failure of the red-green filter pair to handle the spectrum problem suggested that some other filter pair would be better. In the first place, Dr. Land's original experiments simply took off from the observation that when only two of the three transparencies of a three-color system were used, full color could be observed. He was using the standard three-color separation filters, the Wratten #25 red, Wratten #58 green and Wratten #47 blue, and simply omitted the blue.

Is there any reason to suppose that the two which had been originally developed to be part of a three-filter system should be the best possible for this new approach?

Well . . . there are several completely impossible-nonsense effects to be observed. For instance, in the cover scene, there's a piece of purple cloth in the center of the picture, on the table. Now the red and green filters are both opaque to blue-violet and violet; therefore, clearly, there can be no information present to distinguish blue or violet from black.

Obviously the Land system can't show blue, blue-violet, or violet, therefore.

Only . . . the violet can be recognized, even by someone who has not seen the setup nor a Kodachrome of it.

Then yellow, which is well recorded by both the red and green records, should be handled nicely.

It isn't; small areas, such as the basket and the spool of thread in the sewing-table scene, show a nice yellow-effect. But the pastel yellow of the tablecloth comes out white. Large areas of yellow have very poor color.

A lot of things that sound *physically* impossible—blue-violet simply cannot be recorded; physical instruments can demonstrate that violet and blue-violet cannot pass through either filter—somehow leak through the firm laws of physics and show up anyway. Predicting what will and will not happen in this area is, at this point in history, a little worse than "confused."

But that Land's original happenstance red-green filter pair should be the best possible pair is improbable.

So I tried some others. A yellow-blue pair would cover the entire spectrum, which the red-green pair does not.

That pair covers the spectrum all right . . . but it makes no distinction whatever between red, orange, yellow and yellow-green. The projections don't give any color-effect worth the trouble.

I tried the magenta (minus green) and green as a pair. They, too, cover the spectrum completely. But that system makes a complete confusion between red-orange and blue-through-violet; results were no good.

Eastman Kodak's Wratten Filter division is the only filter-manufacturer who publishes fully detailed characteristic curves for their filters, and makes those catalogues really available. Many of the larger photographic stores have them in stock; any of them can order the catalogue for you. Any of the catalogued filters can be ordered. But some of them are a long time coming; I waited over three months for that #106 in Series VII mounting, and I was unable to test the next possibility until I got it and the #38-A. The #106 is designed to make the normally high-blue-sensitive vacuum type photoelectric cell have a net resultant equal-sensitivity-to-all colors. It's nearly transparent to the red-orange end, and becomes progressively less transparent toward the blue and violet end. It's curve is a slanting line across the spectrum, slanting down from the red to near zero in the violet.

The #38-A is intended for another type of photometric work; it's almost

entirely transparent in the blue, and nearly opaque in the red; its curve is a line slanting across the spectrum at an angle the reverse of that of the #106.

Note that on the light-box display, the #106 shows almost exactly the same color as the #23 orange filter. But the two do not match at all as seen by the various color-filter shots; the orange filter transmits everything in the red and orange section of the spectrum freely . . . and then chops off abruptly to nearly zero transmission in the orange-yellow. Its curve is a step-function, going abruptly from "all" to "nothing."

To human eyes . . they match. To the spectrophotometer, the #106 and the #23 are totally dissimilar. The #23 is "a true orange"; the #106 is only describable as a "warm white." In some of my experiments, after I'd finally gotten the #38-A, but hadn't yet gotten the #106, I set up a scene, and illuminated it with two 500-watt photoflood lamps, and made a shot with the #38-A filter. Then I replaced the photoflood bulbs with 150-watt reflector flood lamps, plugged them into a Variac, and dropped the voltage to sixty volts. The resultant orange-red illumination was very nearly equivalent to taking a shot with the photofloods and the missing #106 filter on the lens. In each case, the light reaching the film was heavily predominant in the red-orange, but contained appreciable yellow, some green, and a little blue. The #106 filter can't be named as to color in the normal physics-wavelength-correlation color terms; it's a warm-white. And the #38-A is a "blue white" or "cold white."

I needed that #106 to make the spectrum test; that couldn't be done by changing the light source! The #106 and #38-A between them constitute a pair that will both record information about every part of the spectrum—and non-ambiguously. This pair can encode information such that for every color there is a unique ratio of intensities, and no wave length is "black" to either one.

Well, it sure made a lot of sense . . . but it didn't work. Not only did it not give a spectrum color effect, that pair didn't do as well on the standard scene as the red-green pair.

And the red-green pair just *can't* be the optimum answer! It's improbable in the first place, simply on the basis that something developed for Purpose A should prove to be the best possible for Purpose B.

And . . . somehow the human eye does encode the pure colors of the spectrum, and does it with incredible discrimination. A trained spectroscopist can guesstimate the wave length of a single patch of monochrome light as accurately as a musician can guesstimate the pitch of a single musical note.

That's why I say, "The basic patents on color photography haven't been issued yet. We just thought they had!"

THE END

# DEATHWORLD

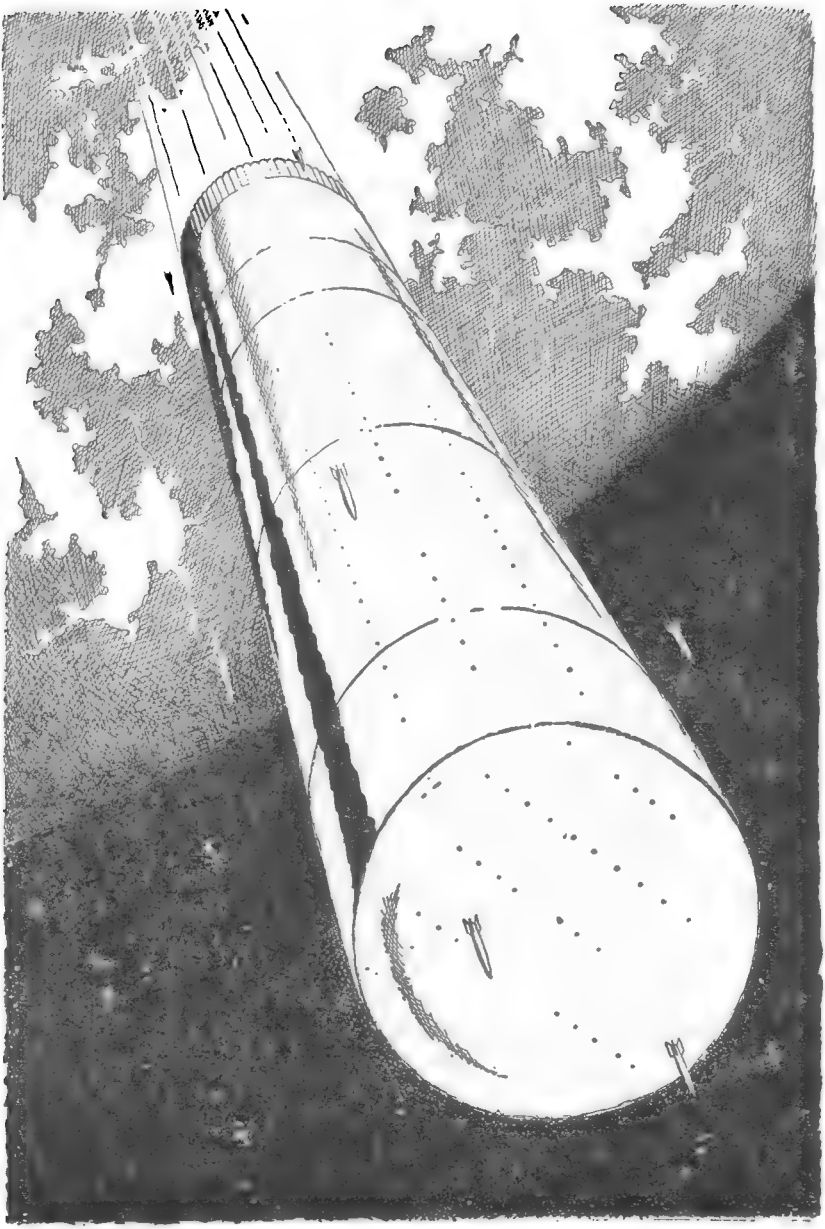
## By HARRY HARRISON

***Second of Three Parts. A touch of psi to help luck along was a great thing for a gambler. But on Deathworld, danger wasn't a gamble; it was an absolute certainty!***

Jason dinAlt *is a professional gambler. He is understandably suspicious when a total stranger,* Kerk Pyrrus, *gives him twenty-seven million credits in cash to gamble with. Kerk is a mystery. Though middle-aged, he is the strongest man with the fastest gun Jason has ever met. His planet, Pyrrus, needs three billion credits at once. This can only be obtained by gambling. Jason is to keep all winnings above this figure for himself.*

*It is impossible for Jason to say*

Illustrated by van Dongen



*no. He wins the money by using his psi power, the ability to control the fall of dice with his mind. Kerk helps him to fight free of the gambling casino: they escape together. Only then does Jason discover that the money is to be used to purchase war materials. His anger fades when Kerk explains that the battle is against a planet—not against sentient creatures.*

*Pyrrus is a planet where mankind doesn't belong—yet it has been settled for three hundred years. The gravity is twice that of Earth. The climate varies from tropic to arctic daily, and the native beasts are fierce beyond imagining. The average life expectancy of the Pyrran settlers is sixteen years.*

*Instead of being frightened, Jason finds himself inversely attracted to this deadly world. He forces reluctant permission from Kerk to let him return on the Pyrran ship. They fight their way off the planet and join the cargo ship, Pyrrus bound.*

*The pilot of the ship is a young and lovely girl,* Meta. *Jason likes her and is with her constantly during the trip. But after the ship lands he has no time for her or anything else. Staying alive is a full-time job.*

*Pyrrus is far worse than he imagined. The gravity is a constant, tiring burden, and nightmares destroy his sleep. He cannot leave the sealed buildings of the survival school until he has completed weary months of training.*

*When he gains the proficiency in survival to leave the school, he makes some startling observations. The Pyrrans are slowly losing their battle for survival. In a few more centuries they will all be dead at the present rate of population loss. Kerk almost kills him when he discusses this taboo topic, but is halted by astonishment when Jason tells him there is a way to end the war.*

*All of the Pyrran life forms have an unnatural hatred of mankind. And are constantly altering to become more deadly. The factors indicate that there is some force controlling this planet-wide attack. Jason obtains Kerk's permission to look for this hidden factor.*

*Jason searches for any historical records that might help him, but finds none. There are only technical works in the library, all other records and books have been destroyed by vermin. Jason kicks at the litter in anger and uncovers a metal box, made to hold a spaceship's log.*

## PART 2

### XI.

RESEALING the cellar, they carried the box back to Jason's new office. Only after spraying with decontaminant, did they examine it closely. Meta picked out engraved letters on the lid.

"S. T. POLLUX VICTORY—that must be the name of the spacer this log came from. But I don't recognize the class, or whatever it is the initials *S. T.* stand for."

"Stellar Transport," Jason told her, as he tried the lock mechanism. "I've heard of them but I've never seen one. They were built during the last wave of galactic expansion. Really nothing more than gigantic metal containers, put together in space. After they were loaded with people, machinery and supplies, they would be towed to whatever planetary system had been chosen. These same tugs and one-shot rockets would brake the S. T.'s in for a landing. Then leave them there. The hull was a ready source of metal and the colonists could start right in building their new world. And they were *big*. All of them held at least fifty thousand people . . ."

Only after he said it, did he realize the significance of his words. Meta's deadly stare drove it home. There were now less people on Pyrrus than had been in the original settlement.

And human population, without rigid birth controls, usually increased geometrically. Jason dinAlt suddenly remembered Meta's itchy trigger finger.

"But we can't be sure how many people were aboard this one," he said hurriedly. "Or even if this is the log of the ship that settled Pyrrus. Can you find something to pry this open with? The lock is corroded into a single lump."

Meta took her anger out on the box. Her fingers managed to force a gap between lid and bottom. She wrenched at it. Rusty metal screeched and tore. The lid came off in her hands and a heavy book thudded to the table.

The cover legend destroyed all doubt.

LOG OF S. T. POLLUX VICTORY. OUTWARD BOUND—SETANI TO PYRRUS. 55,000 SETTLERS ABOARD.

Meta couldn't argue now. She stood behind Jason with tight clenched fists and read over his shoulder as he turned the brittle, yellowed pages. He quickly skipped through the opening part that covered the sailing preparations and trip out. Only when he had reached the actual landing did he start reading slowly. The impact of the ancient words leaped out at him.

"Here it is," Jason shouted. "Proof positive that we're on the right trail. Even *you* will have to admit that. Read it, right here."

*. . . Second day since the tugs left, we are completely on our own now. The settlers still haven't grown used to this planet, though we have orientation talks every night. As well as the morale agents who I have working twenty hours a day. I suppose I really can't blame the people, they all lived in the underways of Setani and I doubt if they saw the sun once a year. This planet has weather with a vengeance, worse than anything I've seen on a hundred other planets. Was I wrong during the original planning stages not to insist on settlers from one of the agrarian worlds? People who could handle the outdoors.*

*These citified Setanians are*

*afraid to go out in the rain. But of course they have adapted completely to their native 1.5 gravity so the two gee here doesn't bother them much. That was the factor that decided us. Anyway—too late now to do anything about it. Or about the unending cycle of rain, snow, hail, hurricanes and such. Answer will be to start the mines going, sell the metals and build completely enclosed cities.*

*The only thing on this forsaken planet that isn't actually against us are the animals. A few large predators at first, but the guards made short work of them. The rest of the wild life leaves us alone. Glad of that! They have been fighting for existence so long that I have never seen a more deadly looking collection. Even the little rodents no bigger than a man's hand are armored like tanks . .*

"I don't believe a word of it," Meta broke in. "That can't be Pyrrus he's writing about . . ." Her words died away as Jason wordlessly pointed to the title on the cover.

He continued scanning the pages, flipping them quickly. A sentence caught his eye and he stopped. Jamming his finger against the place, he read aloud.

". . . And troubles keep piling up. First Har Palo with his theory that the vulcanism is so close to the surface that the ground keeps warm and the crops grow so well. Even if he is right—what can we do? We must be self dependent if we intend to survive. And now this other thing. It seems that the forest fire drove a lot of new species our way. Animals, insects and even birds have attacked the people. (Note for Har: check if possible seasonal migration might explain attacks.) There have been fourteen deaths from wounds and poisoning. We'll have to enforce the rules for insect lotion at all times. And I suppose build some kind of perimeter defense to keep the larger beasts out of the camp."

"This is a beginning," Jason said. "At least now we are aware of the real nature of the battle we're engaged in. It doesn't make Pyrrus any easier to handle, or make the life forms less dangerous, to know that they were once better disposed towards mankind. All this does is point the way. Something took the peaceful life forms, shook them up, and turned this planet into one big deathtrap for mankind. That *something* is what I want to uncover."

## XII.

Further reading of the log produced no new evidence. There was a good deal more information about the early animal and plant life and how deadly they were, as well as the first defenses against them. Interesting historically, but of no use whatsoever in countering the menace. The captain apparently never thought that life forms were altering on Pyrrus, believing instead that dangerous beasts were being discovered. He never lived to change his mind. The last entry in the log, less than two months after the first attack, was

very brief. And in a different handwriting.

*Captain Kurkowski died today, of poisoning following an insect bite. His death is greatly mourned.*

The "why" of the planetary revulsion had yet to be uncovered.

"Kerk must see this book," Jason said. "He should have some idea of the progress being made. Can we get transportation—or do we walk to city hall?"

"Walk, of course," Meta said.

"Then you bring the book. At two-G's I find it very hard to be a gentleman and carry the packages."

They had just entered Kerk's outer office when a shrill screaming burst out of the phone-screen. It took Jason a moment to realize that it was a mechanical signal, not a human voice.

"What is it?" he asked.

Kerk burst through the door and headed for the street entrance. Everyone else in the office was going the same way. Meta looked confused, leaning towards the door, then looking back at Jason.

"What does it mean? Can't you tell me?" He shook her arm.

"Sector alarm. A major breakthrough of some kind at the perimeter. Everyone but other perimeter guards has to answer."

"Well go then," he said. "Don't worry about me. I'll be all right."

His words acted like a trigger release. Meta's gun was in her hand and she was gone before he had finished speaking. Jason sat down wearily in the deserted office.

The unnatural silence in the building began to get on his nerves. He shifted his chair over to the phone-screen and switched it on to *receive*. The screen exploded with color and sound. At first Jason could make no sense of it at all. Just a confused jumble of faces and voices. It was a multi-channel set designed for military use. A number of images were carried on the screen at one time, rows of heads or hazy backgrounds where the user had left the field of view. Many of the heads were talking at the same time and the babble of their voices made no sense whatsoever.

After examining the controls and making a few experiments, Jason began to understand the operation. Though all stations were on the screen at all times, their audio channels could be controlled. In that way two, three or more stations could be hooked together in a link-up. They would be in round-robin communication with each other, yet never out of contact with the other stations.

Identification between voice and sound was automatic. Whenever one of the pictured images spoke, the image would glow red. By trial and error Jason brought in the audio for the stations he wanted and tried to follow the course of the attack.

Very quickly he realized this was something out of the ordinary. In some way, no one made it clear, a section of the perimeter had been broken through and emergency defenses had to be thrown up to encapsulate it. Kerk seemed to be in

charge, at least he was the only one with an override transmitter. He used it for general commands. The many, tiny images faded and his face appeared on top of them, filling the entire screen.

"All perimeter stations send twenty-five per cent of your complement to Area Twelve."

The small images reappeared and the babble increased, red lights flickering from face to face.

". . . Abandon the first floor, acid bombs can't reach."

"If we hold we'll be cut off, but salient is past us on the west flank. Request support."

"DON'T MERVV . . . IT'S USELESS!"

". . . And the nepalm tanks are almost gone. Orders?"

"The truck is still there, get it to the supply warehouse, you'll find replacements . . ."

Out of the welter of talk, only the last two fragments made any sense. Jason had noticed the signs below when he came in. The first two floors of the building below him were jammed with military supplies. This was his chance to get into the act.

Just sitting and watching was frustrating. Particularly when it was a desperate emergency. He didn't overvalue his worth, but he was sure there was always room for another gun.

By the time he had dragged himself down to the street level a turbotruck had slammed to a stop in front of the loading platform. Two Pyrrans were rolling out drums of nepalm with reckless disregard for their own safety. Jason didn't dare enter that maelstrom of rolling metal. He found he could be of use tugging the heavy drums into position on the truck while the others rolled them up. They accepted his aid without acknowledgment.

It was exhausting, sweaty work, hauling the leaden drums into place against the heavy gravity. After a minute Jason worked by touch through a red haze of hammering blood. He realized the job was done only when the truck suddenly leaped forward and he was thrown to the floor. He lay there, his chest heaving. As the driver hurled the heavy vehicle along, all Jason could do was bounce around in the bottom. He could see well enough, but was still gasping for breath when they braked at the fighting zone.

To Jason, it was a scene of incredible confusion. Guns firing, flames, men and women running on all sides. The nepalm drums were unloaded without his help and the truck vanished for more. Jason leaned against a wall of a half-destroyed building and tried to get his bearings. It was impossible. There seemed to be a great number of small animals; he killed two that attacked him. Other than that he couldn't determine the nature of the battle.

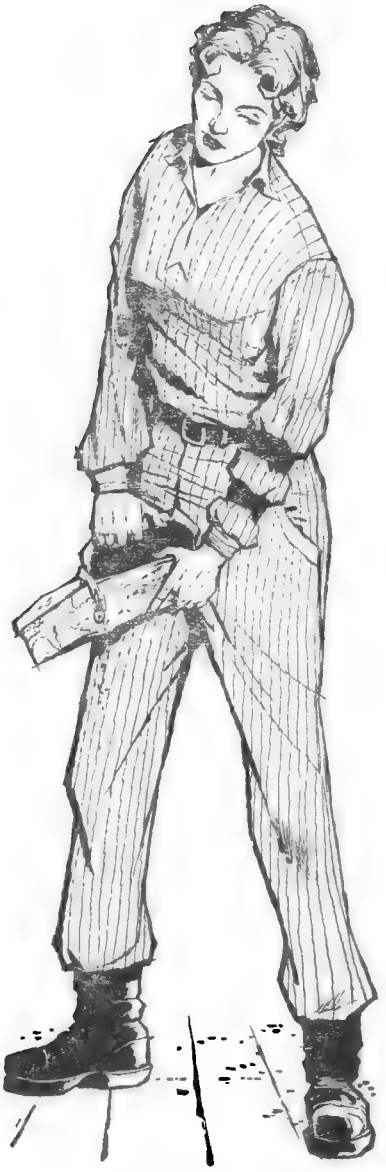
A Pyrran, tan face white with pain and exertion, stumbled up. His right arm, wet with raw flesh and dripping blood, hung limply at his side. It was covered with freshly applied surgical foam. He held his gun in his left

hand, a stump of control cable dangling from it. Jason thought the man was looking for medical aid. He couldn't have been more wrong.

Clenching the gun in his teeth, the Pyrran clutched a barrel of nepalm with his good hand and hurled it over on its side. Then, with the gun once more in his hand, he began to roll the drum along the ground with his feet. It was slow, cumbersome work, but he was still in the fight.

Jason pushed through the hurrying crowd and bent over the drum. "Let me do it," he said. "You can cover us both with your gun."

The man wiped the sweat from his eyes with the back of his arm and blinked at Jason. He seemed to recognize him. When he smiled it was a grimace of pain, empty of humor. "Do that. I can still shoot. Two half men—maybe we equal one whole." Jason was laboring too hard to even notice the insult.



An explosion had blasted a raw pit in the street ahead. Two people were at the bottom, digging it even deeper with shovels. The whole thing seemed meaningless. Just as Jason and the wounded man rolled up the drum the diggers leaped out of the excavation and began shooting down into its depths. One of them turned, a young girl, barely in her teens.

"Praise Perimeter!" she breathed. "They found the nepalm. One of the new horrors is breaking through towards Thirteen, we just found it." Even as she talked she swiveled the drum around, kicked the easy-off

plug, and began dumping the gelid contents into the hole. When half of it had gurgled down, she kicked the drum itself in. Her companion pulled a flare from his belt, lit it, and threw it after the drum.

"Back quick. They don't like heat," he said.

This was putting it very mildly. The nepalm caught, tongues of flame and roiling, greasy smoke climbed up to the sky. Under Jason's feet the earth shifted and moved. *Something* black and long stirred in the heart of the flame, then arched up into the sky over their heads. In the midst of the searing heat it still moved with alien, jolting motions. It was immense, at least two meters thick and with no indication of its length. The flames didn't stop it at all, just annoyed it.

Jason had some idea of the thing's length as the street cracked and buckled for fifty meters on each side of the pit. Great loops of the creature began to emerge from the ground. He fired his gun, as did the others. Not that it seemed to have any effect. More and more people were appearing, armed with a variety of weapons. Flame throwers and grenades seemed to be the most effective.

*"Clear the area . . . we're going to saturate it. Fall back."*

The voice was so loud it jarred Jason's ear. He turned and recognized Kerk, who had arrived with truckloads of equipment. He had a power speaker on his back, the mike hung in front of his lips. His amplified voice brought an instant reaction from the crowd. They began to move.

There was still doubt in Jason's mind what to do. Clear the area? But what area? He started towards Kerk, before he realized that the rest of the Pyrrans were going in the opposite direction. Even under two gravities they *moved.*

Jason had a naked feeling of being alone on the stage. He was in the center of the street, and the others had vanished. No one remained. Except the wounded man Jason had helped. He stumbled towards Jason, waving his good arm. Jason couldn't understand what he said. Kerk was shouting orders again from one of the trucks. They had started to move too. The urgency struck home and Jason started to run.

It was too late. On all sides the earth was buckling, cracking, as more loops of the underground thing forced its way into the light. Safety lay ahead. Only in front of it rose an arch of dirt encrusted gray.

There are seconds of time that seem to last an eternity. A moment of subjective time that is grabbed and stretched to an infinite distance. This was one of those moments. Jason stood, frozen. Even the smoke in the sky hung unmoving. The high-standing loop of alien life was before him, every detail piercingly clear.

Thick as a man, ribbed and gray as old bark. Tendrils projected from all parts of it, pallid and twisting lengths that writhed slowly with snakelike life. Shaped like a plant, yet with the motions of an animal.

And cracking, splitting. This was the worst.

Seams and openings appeared. Splintering, gaping mouths that vomited out a horde of pallid animals. Jason heard their shriekings, shrill yet remote. He saw the needle-like teeth that lined their jaws.

The paralysis of the unknown held him there. He should have died. Kerk was thundering at him through the power speaker, others were firing into the attacking creature. Jason knew nothing.

Then he was shot forward, pushed by a rock-hard shoulder. The wounded man was still there, trying to get Jason clear. Gun clenched in his jaws he dragged Jason along with his good arm. Towards the creature. The others stopped firing. They saw his plan and it was a good one.

A loop of the thing arched into the air, leaving an opening between its body and the ground. The wounded Pyrran planted his feet and tightened his muscles. One-handed, with a single thrust, he picked Jason off the ground and sent him hurtling under the living arch. Moving tendrils brushed fire along his face, then he was through, rolling over and over on the ground. The wounded Pyrran leaped after him.

It was too late. There had been a chance for one person to get out. The Pyrran could have done it easily—instead he had pushed Jason first. The thing was aware of movement when Jason brushed its tendrils. It dropped and caught the wounded man under its weight. He vanished from sight as the tendrils wrapped around him and the animals swarmed over. His trigger must have pulled back to full automatic because the gun kept firing a long time after he should have been dead.

Jason crawled. Some of the fanged animals ran towards him, but were shot. He knew nothing about this. Then rude hands grabbed him up and pulled him forward. He slammed into the side of a truck and Kerk's face was in front of his, flushed and angry. One of the giant fists closed on the front of Jason's clothes and and he was lifted off his feet, shaken like a limp bag of rags. He offered no protest and could not have even if Kerk had killed him.

When he was thrown to the ground, someone picked him up and slid him into the back of the truck. He did not lose consciousness as the truck bounced away, yet he could not move. In a moment the fatigue would go away and he would sit up. That was all he was, just a little tired. Even as he thought this he passed out.

## XIII.

"Just like old times," Jason said when Brucco came into the room with a tray of food. Without a word Brucco served Jason and the wounded men in the other beds, then left. "Thanks," Jason called after his retreating back.

A joke, a twist of a grin, like it always was. Sure. But even as he grinned and his lips shaped a joke, Jason felt them like a veneer on the

outside. Something plastered on with a life of its own. Inside he was numb and immovable. His body was stiff as his eyes still watched that arch of alien flesh descend and smother the one-armed Pyrran with its million burning fingers.

He could feel himself under the arch. After all, hadn't the wounded man taken his place? He finished the meal without realizing that he ate.

Ever since that morning, when he had recovered consciousness, it had been like this. He knew that he should have died out there in that battle-torn street. *His* life should have been snuffed out, for making the mistake of thinking that he could actually help the battling Pyrrans. Instead of being underfoot and in the way. If it hadn't been for Jason, the man with the wounded arm would have been brought here to the safety of the reorientation buildings. He knew he was lying in the bed that belonged to that man.

The man who had given his life for Jason's.

The man whose name he didn't even know.

There were drugs in the food and they made him sleep. The medicated pads soaked the pain and rawness out of the burns where the tentacles had seared his face. When he awoke the second time, his touch with reality had been restored.

A man had died so he could live. Jason faced the fact. He couldn't restore that life, no matter how much he wanted to. What he could do was make the man's death worth while. If it can be said that any death was worth while . He forced his thoughts from that track.

Jason knew what he had to do. His work was even more important now. If he could solve the riddle of this deadly world, he could repay in part the debt he owed.

Sitting up made his head spin and he held to the edge of the bed until it slowed down. The others in the room ignored him as he slowly and painfully dragged on his clothes. Brucco came in, saw what he was doing, and left again without a word.

Dressing took a long time, but it was finally done. When Jason finally left the room he found Kerk waiting for him.

"Kerk . . . I want to tell you . . ."

"Tell me *nothing!*" The thunder of Kerk's voice bounced back from the ceiling and walls. "I'm telling *you*. I'll tell you once and that will be the end of it. You're not wanted on Pyrrus, Jason dinAlt, neither you nor your precious off-world schemes are wanted here. I let you convince me once with your twisted tongue. Helped you at the expense of more important work. I should have known what the result of your 'logic' would be. Now I've seen. Welf died so you could live. He was twice the man you will ever be."

"Welf? Was that his name?" Jason asked stumblingly. "I didn't know—"

"You didn't even know." Kerk's lips pulled back from his teeth in a grimace of disgust. "You didn't even

know his name—yet he died that you might continue your miserable existence." Kerk spat, as if the words gave a vile flavor to his speech, and stamped towards the exit lock. Almost as an afterthought he turned back to Jason.

"You'll stay here in the sealed buildings until the ship returns in two weeks. Then you will leave this planet and never come back. If you do, I'll kill you instantly. With pleasure." He started through the lock.

"Wait," Jason shouted. "You can't decide like that. You haven't even seen the evidence I've uncovered. Ask Meta—" The lock thumped shut and Kerk was gone.

The whole thing was just too stupid. Anger began to replace the futile despair of a moment before. He was being treated like an irresponsible child, the importance of his discovery of the log completely ignored.

Jason turned and saw for the first time that Brucco was standing there. "Did you hear that?" Jason asked him.

"Yes. And I quite agree. You can consider yourself lucky."

"Lucky!" Jason was the angry one now. "Lucky to be treated like a moronic child, with contempt for everything I do—"

"I said lucky," Brucco snapped. "Welf was Kerk's only surviving son. Kerk had high hopes for him, was training him to take his place eventually." He turned to leave but Jason called after him.

"Wait. I'm sorry about Welf. I can't be any sorrier knowing that he was Kerk's son. But at least it explains why Kerk is so quick to throw me out—as well as the evidence I have uncovered. The log of the ship—"

"I know, I've seen it," Brucco said. "Meta brought it in. Very interesting historical document."

"That's all you can see it as—an historical document? The significance of the planetary change escapes you?"

"It doesn't escape me," Brucco answered briefly, "but I cannot see that it has any relevancy today. The past is unchangeable and we must fight in the present. That is enough to occupy all our energies."

Jason felt too exhausted to argue the point any more. He ran into the same stone wall with all the Pyrrans. Theirs was a logic of the moment. The past and the future unchangeable, unknowable—and uninteresting. "How is the perimeter battle going," he asked, wanting to change the subject.

"Finished. Or in the last stages at least," Brucco was almost enthusiastic as he showed Jason some stereos of the attackers. He did not notice Jason's repressed shudder.

"This was one of the most serious breakthroughs in years, but we caught it in time. I hate to think what would have happened if they hadn't been detected for a few weeks more."

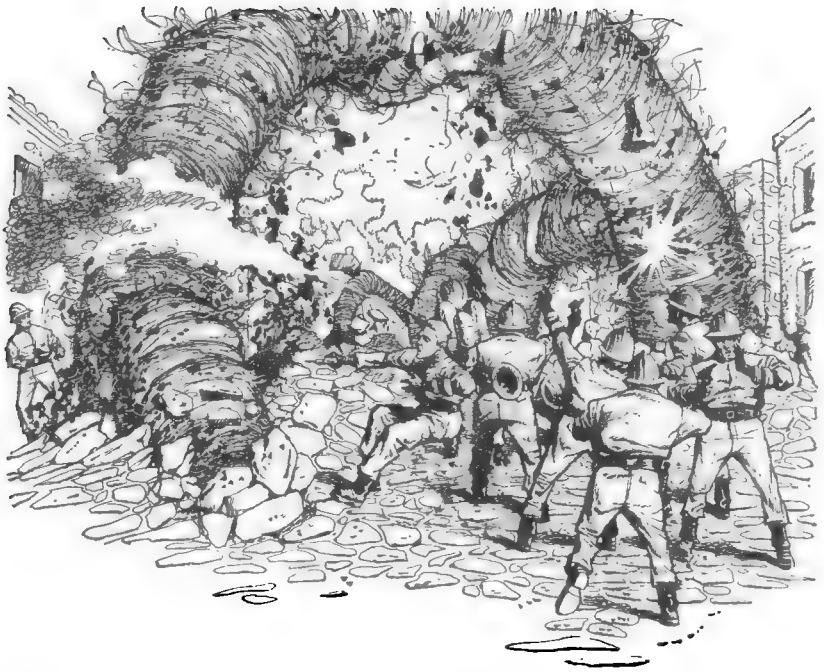
"What are those things," Jason

asked. "Giant snakes of some kind?"

"Don't be absurd," Brucco snorted. He tapped the stereo with his thumbnail. "Roots. That's all. Greatly modified, but still roots. They came in under the perimeter barrier, much deeper than anything we've had before. Not a real threat in themselves as they have very little mobility. Die soon after being cut. The danger came from their being used as access tunnels. They're bored through and through with animal runs, and two or three species of beasts live in a sort of symbiosis inside.

Now we know what they are we can watch for them. The danger was they could have completely undermined the perimeter and come in from all sides at once. Not much we could have done then."

The edge of destruction. Living on the lip of a volcano. The Pyrrans took satisfaction from any day that passed without total annihilation. There seemed no way to change their attitude. Jason let the conversation die there. He picked up the log of the *Pollux Victory* from Brucco's quarters and carried it back to his room. The wounded Pyrrans there ignored him as he dropped onto the bed and opened the book to the first page.



For two days he did not leave his quarters. The wounded men were soon gone and he had the room to himself. Page by page he went through the log, until he knew every detail of the settlement of Pyrrus. His notes and crossreferences piled up. He made an accurate map of the original settlement, superimposed over a modern one. They didn't match at all.

It was a dead end. With one map held over the other, what he had suspected was painfully clear. The descriptions of terrain and physical features in the log were accurate enough. The city had obviously been moved since the first landing. Whatever records had been kept would be in the library—and he had exhausted that source. Anything else would have been left behind and long since destroyed.

Rain lashed against the thick window above his head, lit suddenly by a flare of lightning. The unseen volcanoes were active again, vibrating the floor with their rumblings deep in the earth.

The shadow of defeat pressed heavily down on Jason. Rounding his shoulders and darkening, even more, the overcast day.

## XIV.

Jason spent one depressed day lying on his bunk counting rivets, forcing himself to accept defeat. Kerk's order that he was not to leave the sealed building tied his hands completely. He felt himself close to the answer—but he was never going to get it.

One day of defeat was all he could take. Kerk's attitude was completely emotional, untempered by the slightest touch of logic. This fact kept driving home until Jason could no longer ignore it. Emotional reasoning was something he had learned to mistrust early in life. He couldn't agree with Kerk in the slightest—which meant he had to utilize the ten remaining days to solve the problem. If it meant disobeying Kerk, it would still have to be done.

He grabbed up his noteplate with a new enthusiasm. His first sources of information had been used up, but there must be others. Chewing the scriber and needling his brain, he slowly built up a list of other possibilities. Any idea, no matter how wild, was put down. When the plate was filled he wiped the long shots and impossibles—such as consulting off-world historical records. This was a Pyrran problem, and had to be settled on this planet or not at all.

The list worked down to two probables. Either old records, notebooks or diaries that individual Pyrrans might have in their possession, or verbal histories that had been passed down the generations by word of mouth. The first choice seemed to be the most probable and he acted on it at once. After a careful check of his medikit and gun he went to see Brucco.

"What's new and deadly in the world since I left?" he asked.

Brucco glared at him. "You can't

go out, Kerk has forbidden it."

"Did he put you in charge of guarding me to see if I obeyed?" Jason's voice was quiet and cold.

Brucco rubbed his jaw and frowned in thought. Finally he just shrugged. "No, I'm not guarding you—nor do I want the job. As far as I know this is between you and Kerk and it can stay that way. Leave whenever you want. And get yourself killed quietly some place so there will be an end to the trouble you cause once and for all."

"I love you, too," Jason said. "Now brief me on the wildlife."

The only new mutation that routine precautions wouldn't take care of was a slate colored lizard that spit a fast nerve poison with deadly accuracy. Death took place in seconds if the saliva touched any bare skin. The lizards had to be looked out for, and shot before they came within range. An hour of lizard-blasting in a training chamber made him proficient in the exact procedure.

Jason left the sealed buildings quietly and no one saw him go. He followed the map to the nearest barracks, shuffling tiredly through the dusty streets. It was a hot, quiet afternoon, broken only by rumblings from the distance, and the occasional crack of his gun.

It was cool inside the thick-walled barracks buildings, and he collapsed onto a bench until the sweat dried and his heart stopped pounding. Then he went to the nearest recreation room to start his search.

Before it began it was finished. None of the Pyrrans kept old artifacts of any kind and thought the whole idea was very funny. After the twentieth negative answer Jason was ready to admit defeat in this line of investigation. There was as much chance of meeting a Pyrran with old documents as finding a bundle of grandfather's letters in a soldier's kit bag.

This left a single possibility—verb-all histories. Again Jason questioned with the same lack of results. The fun had worn off the game for the Pyrrans and they were beginning to growl. Jason stopped while he was still in one piece. The commissary served him a meal that tasted like plastic paste and wood pulp. He ate it quickly, then sat brooding over the empty tray, hating to admit to another dead end. Who could supply him with answers? All the people he had talked to were so young. They had no interest or patience for story telling. That was an old folks hobby—and there were no oldsters on Pyrrus.

With one exception that he knew of, the librarian, Poli. It was a possibility. A man who worked with records and books might have an interest in some of the older ones. He might even remember reading volumes now destroyed. A very slim lead indeed, but one that had to be pursued.

Walking to the library almost killed Jason. The torrential rains made the footing bad, and in the dim light it was hard to see what was coming. A snapper came in close enough to

take out a chunk of flesh before he could blast it. The antitoxin made him dizzy and he lost some blood before he could get the wound dressed. He reached the library, exhausted and angry.

Poli was working on the guts of one of the catalogue machines. He didn't stop until Jason had tapped him on the shoulder. Switching on his hearing aid, the Pyrran stood quietly, crippled and bent, waiting for Jason to talk.

"Have you any old papers or letters that you have kept for your personal use?"

A shake of the head *no.*

"What about stories—you know, about great things that have happened in the past, that someone might have told you when you were young?" Negative.

Results negative. Every question was answered by a shake of Poli's head, and very soon the old man grew irritated and pointed to the work he hadn't finished.

"Yes, I know you have work to do," Jason said. "But this is important." Poli shook his head an angry *no* and reached to turn off his hearing aid. Jason groped for a question that might get a more positive answer. There was something tugging at his mind, a word he had heard and made a note of, to be investigated later. Something that Kerk had said . . .

"That's it!" It was right there—on the tip of his tongue. "Just a second Poli, just one more question. What is a 'grubber'? Have you ever seen one or know what they do, or where they can be found—"

The words were cut off as Poli whirled and lashed the back of his good arm into Jason's face. Though the man was aged and crippled, the blow almost fractured Jason's jaw, sending him sliding across the floor. Through a daze he saw Poli hobbling towards him, making thick bubbling noises in his ruined throat; what remained of his face twisted and working with anger.

This was no time for diplomacy. Moving as fast as he could, with the high-G, foot slapping shuffle, Jason headed for the sealed door. He was no match for any Pyrran in hand-to-hand combat, young and small or old and crippled. The door thunked open, as he went through, and barely closed in Poli's face.

Outside the rain had turned to snow and Jason trudged wearily through the slush, rubbing his sore jaw and turning over the only fact he had. *Grubber* was a key—but to what? And who did he dare ask for more information? Kerk was the man he had talked to best, but not any more. That left only Meta as a possible source. He wanted to see her at once, but sudden exhaustion swept through him. It took all of his strength to stumble back to the school buildings.

In the morning he ate and left early. There was only a week left. It was impossible to hurry and he cursed as he dragged his double-weight body to the assignment center.

Meta was on night perimeter duty and should be back to her quarters soon. He shuffled over there and was lying on her bunk when she came in.

"Get out," she said in a flat voice. "Or do I throw you out?"

"Patience, please," he said as he sat up. "Just resting here until you came back. I have a single question, and if you will answer it for me I'll go and stop bothering you."

"What is it?" she asked, tapping her foot with impatience. But there was also a touch of curiosity in her voice. Jason thought carefully before he spoke.

"Now *please,* don't shoot me. You know I'm an off-worlder with a big mouth, and you have heard me say some awful things without taking a shot at me. Now I have another one. Will you please show your superiority to the other people of the galaxy by holding your temper and not reducing me to component atoms."

His only answer was a tap of the foot, so he took a deep breath and plunged in.

"What is a 'grubber'?"

For a long moment she was quiet, unmoving. Then she curled her lips back in disgust. "You find the most repulsive topics."

"That may be so," he said, "but it still doesn't answer my question."

"It's . . . well, the sort of thing people just don't talk about."

"I do," he assured her.

"Well I *don't!* It's the most disgusting thing in the world, and that's all I'm going to say. Talk to Krannon, but not to me." She had him by the arm while she talked and he was half dragged to the hall. The door slammed behind him and he muttered *"lady wrestler"* under his breath. His anger ebbed away as he realized that she had given him a clue in spite of herself. Next step, find out who or what Krannon was.

Assignment center listed a man named Krannon, and gave his shift number and work location. It was close by and Jason walked there. A large, cubical, and windowless building, with the single word *food* next to each of the sealed entrances. The small entrance he went through was a series of automatic chambers that cycled him through ultrasonics, ultraviolet, antibio spray, rotating brushes and three final rinses. He was finally admitted, damper but much cleaner to the central area. Men and robots were stacking crates and he asked one of the men for Krannon. The man looked him up and down coldly and spat on his shoes before answering.

Krannon worked in a large storage bay by himself. He was a stocky man in patched coveralls whose only expression was one of intense gloom. When Jason came in he stopped hauling bales and sat down on the nearest one. The lines of unhappiness were cut into his face and seemed to grow deeper while Jason explained what he was after. All the talk of ancient history on Pyrrus bored him as well and he yawned openly. When Jason finished he yawned again and didn't even bother to answer him.

Jason waited a moment, then asked again. "I said do you have any old books, papers, records or that sort of thing?"

"You sure picked the right guy to bother, off-worlder," was his only answer. "After talking to me you're going to have nothing but trouble."

"Why is that," Jason asked.

"Why?" For the first time he was animated with something besides grief. "I'll tell you why! I made one mistake, just one, and I get a life sentence. For life—how would you like that? Just me alone, being by myself all the time. Even taking orders from the grubbers."

Jason controlled himself, keeping the elation out of his voice. "Grubbers? What are grubbers?"

The enormity of the question stopped Krannon, it seemed impossible that there could be a man alive who had never heard of grubbers. Happiness lifted some of the gloom from his face as he realized that he had a captive audience who would listen to his troubles.

"Grubbers are traitors—that's what they are. Traitors to the human race and they ought to be wiped out. Living in the jungle. The things they do with the animals—"

"You mean they're people . . . Pyrrans like yourself?" Jason broke in.

"Not like *me,* mister. Don't make that mistake again if you want to go on living. Maybe I dozed off on guard once so I got stuck with this job. That doesn't mean I like it or like them. They stink, really stink, and if it wasn't for the food we get from them they'd all be dead tomorrow. That's the kind of killing job I could really put my heart into."

"If they supply you with food, you must give them something in return?"

"Trade goods, beads, knives, the usual things. Supply sends them over in cartons and I take care of the delivery."

"How?" Jason asked.

"By armored truck to the delivery site. Then I go back later to pick up the food they've left in exchange."

"Can I go with you on the next delivery?"

Krannon frowned over the idea for a minute. "Yeah, I suppose it's all right if you're stupid enough to come. You can help me load. They're between harvests now, so the next trip won't be for eight days—"

"But that's after the ship leaves—it'll be too late. Can't you go earlier?"

"Don't tell me your troubles, mister," Krannon grumbled, climbing to his feet. "That's when I go and the date's not changing for you."

Jason realized he had got as much out of the man as was possible for one session. He started for the door, then turned.

"One thing," he asked. "Just what do these savages—the grubbers—look like?"

"How do I know," Krannon snapped. "I trade with them, I don't make love to them. If I ever saw one, I'd shoot him down on the spot." He flexed his fingers and his gun jumped in and out of his hand as he said it. Jason quietly let himself out.

Lying on his bunk, resting his gravity weary body, he searched for a way to get Krannon to change the delivery date. His millions of credits were worthless on this world without currency. If the man couldn't be convinced, he had to be bribed. With what? Jason's eyes touched the locker where his off-world clothing still hung, and he had an idea.

It was morning before he could return to the food warehouse—and one day closer to his deadline. Krannon didn't bother to look up from his work when Jason came in.

"Do you want this," Jason asked, handing the outcast a flat gold case inset with a single large diamond. Krannon grunted and turned it over in his hands.

"A toy," he said. "What is it good for?"

"Well, when you press this button you get a light." A flame ap-

peared through a hole in the top. Krannon started to hand it back.

"What do I need a little fire for? Here, keep it."

"Wait a second," Jason said, "that's not all it does. When you press the jewel in the center one of these comes out." A black pellet the size of his fingernail dropped into his palm. "A grenade, made of solid ulranite. Just squeeze it hard and throw. Three seconds later it explodes with enough force to blast open this building."

This time Krannon almost smiled as he reached for the case. Destructive and death dealing weapons are like candy to a Pyrran. While he looked at it Jason made his offer.

"The case and bombs are yours if you move the date of your next delivery up to tomorrow—and let me go with you."

"Be here at 0500," Krannon said. "We leave early."

## XV.

The truck rumbled up to the perimeter gate and stopped. Krannon waved to the guards through the front window, then closed a metal shield over it. When the gates swung open the truck—really a giant armored tank—ground slowly forward. There was a second gate beyond the first, that did not open until the interior one was closed. Jason looked through the second-driver's periscope as the outer gate lifted. Automatic flame-throwers flared through the opening, cutting off only when the truck reached them. A scorched area ringed the gate, beyond that the jungle began. Unconsciously Jason shrank back in his seat.

All the plants and animals he had seen only specimens of, existed here in profusion. Thorn-ringed branches and vines laced themselves into a solid mat, through which the wild life swarmed. A fury of sound hurled at them, thuds and scratchings rang on the armor. Krannon laughed and closed the switch that electrified the outer grid. The scratchings died away as the beasts completed the circuit to the grounded hull.

It was slow speed, low-gear work tearing through the jungle. Krannon had his face buried in the periscope mask and silently fought the controls. With each mile the going seemed to get better, until he finally swung up the periscope and opened the window armor. The jungle was still thick and deadly, but nothing like the area immediately around the perimeter. It appeared as if most of the lethal powers of Pyrrus were concentrated in the single area around the settlement. Why? Jason asked himself. Why this intense and planetary hatred?

The motors died and Krannon stood up, stretching. "We're here," he said. "Let's unload."

There was bare rock around the truck, a rounded hillock that projected from the jungle, too smooth and steep for vegetation to get a hold. Krannon opened the cargo

hatches and they pushed out the boxes and crates. When they finished Jason slumped down, exhausted, onto the pile.

"Get back in, we're leaving," Krannon said.

"You are, I'm staying right here."

Krannon looked at him coldly. "Get in the truck or I'll kill you. No one stays out here. For one thing you couldn't live an hour alone. But worse than that the grubbers would get you. Kill you at once, of course, but that's not important. But you have equipment that we can't allow into their hands. You want to see a grubber with a gun?"

While the Pyrran talked, Jason's thoughts had rushed ahead. He hoped that Krannon was as thick of head as he was fast of reflex.

Jason looked at the trees, let his gaze move up through the thick branches. Though Krannon was still talking, he was automatically aware of Jason's attention. When Jason's eyes widened and his gun jumped into his hand, Krannon's own gun appeared and he turned in the same direction.

"There—in the top!" Jason shouted, and fired into the tangle of branches. Krannon fired, too. As soon as he did, Jason hurled himself backward, curled into a ball, rolling down the inclined rock. The shots had covered the sounds of his movements, and before Krannon could turn back the gravity had dragged him down the rock into the thick foliage. Crashing branches slapped at him, but slowed his fall. When he stopped moving he was lost in the tangle. Krannon's shots came too late to hit him.

Lying there, tired and bruised, Jason heard the Pyrran cursing him out. He stamped around on the rock, fired a few shots, but knew better than to enter the trees. Finally he gave up and went back to the truck. The motor gunned into life and the treads clanked and scraped down the rock and back into the jungle. There were muted rumblings and crashes that slowly died away.

Then Jason was alone.

Up until that instant he hadn't realized quite how alone he would be. Surrounded by nothing but death, the truck already vanished from sight. He had to force down an overwhelming desire to run after it. What was done was done.

This was a long chance to take, but it was the only way to contact the grubbers. They were savages, but still they had come from human stock. And they hadn't sunk so low as to stop the barter with the civilized Pyrrans. He had to contact them, befriend them. Find out how they had managed to live safely on this madhouse world.

If there had been another way to lick the problem, he would have taken it; he didn't relish the role of martyred hero. But Kerk and his deadline had forced his hand. The contact had to be made fast and this was the only way.

There was no telling where the savages were, or how soon they would arrive. If the woods weren't too lethal he could hide there, pick his time to approach them. If they found him among the supplies, they might skewer him on the spot with a typical Pyrran reflex.

Walking warily he approached the line of trees. Something moved on a branch, but vanished as he came near. None of the plants near a thick trunked tree looked poisonous, so he slipped behind it. There was nothing deadly in sight and it surprised him. He let his body relax a bit, leaning against the rough bark.

Something soft and choking fell over his head, his body was seized in a steel grip. The more he struggled the tighter it held him until the blood thundered in his ears and his lungs screamed for air.

Only when he grew limp did the pressure let up. His first panic ebbed a little when he realized that it wasn't an animal that attacked him. He knew nothing about the grubbers, but they were human so he still had a chance.

His arms and legs were tied, the power holster ripped from his arm. He felt strangely naked without it. The powerful hands grabbed him again and he was hurled into the air, to fall face down across something warm and soft. Fear pressed in again, it was a large animal of some kind. And all Pyrran animals were deadly.

When the animal moved off, carrying him, panic was replaced by a feeling of mounting elation. The grubbers had managed to work out a truce of some kind with at least one form of animal life. He had to find out how. If he could get that secret—and get it back to the city—it would justify all his work and pain. It might even justify Welf's death if the age-old war could be slowed or stopped.

Jason's tightly bound limbs hurt terribly at first, but grew numb with the circulation shut off. The jolting ride continued endlessly, he had no way of measuring the time. A rainfall soaked him, then he felt his clothes steaming as the sun came out.

The ride was finally over. He was pulled from the animal's back and dumped down. His arms dropped free as someone loosed the bindings. The returning circulation soaked him in pain as he lay there, struggling to move. When his hands finally obeyed him he lifted them to his face and stripped away the covering, a sack of thick fur. Light blinded him as he sucked in breath after breath of clean air.

Blinking against the glare, he looked around. He was lying on a floor of crude planking, the setting sun shining into his eyes through the doorless entrance of the building. There was a ploughed field outside, stretching down the curve of hill to the edge of the jungle. It was too dark to see much inside the hut.

Something blocked the light of the doorway, a tall animallike fig-

ure. On second look Jason realized it was a man with long hair and thick beard. He was dressed in furs, even his legs were wrapped in fur leggings. His eyes were fixed on his captive, while one hand fondled an ax that hung from his waist.

"Who're you? What y'want?" the bearded man asked suddenly.

Jason picked his words slowly, wondering if this savage shared the same hair-trigger temper as the city dwellers.

"My name is Jason. I come in peace. I want to be your friend . . ."

"Lies!" the man grunted, and pulled the ax from his belt. "Junkman tricks. I saw y'hide, Wait to kill me. Kill you first." He tested the edge of the blade with a horny thumb, then raised it.

"Wait!" Jason said desperately. "You don't understand."

The ax swung down.

"I'm from off-world and—"

A solid thunk shook him as the ax buried itself in the wood next to his head. At the last instant the man had twitched it aside. He grabbed the front of Jason's clothes and pulled him up until their faces touched.

"S'true?" he shouted. "Y'from off-world?" His hand opened and Jason dropped back before he could answer. The savage jumped over him, towards the dim rear of the hut.

"Rhes must know of this," he said as he fumbled with something on the wall. Light sprang out.

All Jason could do was stare. The hairy, fur-covered savage was operating a communicator. The calloused, dirt-encrusted fingers deftly snapped open the circuits, dialed a number.

## XVI.

It made no sense. Jason tried to reconcile the modern machine with the barbarian and couldn't. Who was he calling? The existence of one communicator meant there was at least another. Was Rhes a person or a thing?

With a mental effort he grabbed hold of his thoughts and braked them to a stop. There was something new here, factors he hadn't counted on. He kept reassuring himself there was an explanation for everything, once you had your facts straight.

Jason closed his eyes, shutting out the glaring rays of the sun where it cut through the tree tops, and reconsidered his facts. They separated evenly into two classes; those he had observed for himself, and those he had learned from the city dwellers. This last class of "facts" he would hold, to see if they fitted with what, he learned. There was a good chance that most, or all, of them would prove false.

"Get up," the voice jarred into his thoughts. "We're leaving."

His legs were still numb and hardly usable. The bearded man snorted in disgust and hauled him to his feet, propping him against the outer wall. Jason clutched the knobby bark of the logs when he

was left alone. He looked around, soaking up impressions.

It was the first time he had been on a farm since he had run away from home. A different world with a different ecology, but the similarity was apparent enough to him. A new-sown field stretched down the hill in front of the shack. Ploughed by a good farmer. Even, well cast furrows that followed the contour of the slope. Another, larger log building was next to this one, probably a barn.

There was a snuffling sound behind him and Jason turned quickly and froze. His hand called for the missing gun and his finger tightened down on a trigger that wasn't there.

It had come out of the jungle and padded up quietly behind him. It had six thick legs with clawed feet that dug into the ground. The two-meter long body was covered with matted yellow and black fur, all except the skull and shoulders. These were covered with overlapping horny plates. Jason could see all this because the beast was that close.

He waited to die.

The mouth opened, a froglike division of the hairless skull, revealing double rows of jagged teeth.

"Here, Fido," the bearded man said, coming up behind Jason and snapping his fingers at the same time. The thing bounded forward, brushing past the dazed Jason, and rubbed his head against the man's leg. "Nice doggy," the man said, his fingers scratching under the edge of the carapace where it joined the flesh.

The bearded man had brought two of the riding animals out of the barn, saddled and bridled. Jason barely noticed the details of smooth skin and long legs as he swung up on one. His feet were quickly lashed to the stirrups. When they started the skull-headed beast followed them.

"Nice doggy!" Jason said, and for no reason started to laugh. The bearded man turned and scowled at him until he was quiet.

By the time they entered the jungle it was dark. It was impossible to see under the thick foliage, and they used no lights. The animals seemed to know the way. There were scraping noises and shrill calls from the jungle around them, but it didn't bother Jason too much. Perhaps the automatic manner in which the other man undertook the journey reassured him. Or the presence of the "dog" that he felt rather than saw. The trip was a long one, but not too uncomfortable.

The regular motion of the animal and his fatigue overcame Jason and he dozed into a fitful sleep, waking with a start each time he slumped forward. In the end he slept sitting up in the saddle. Hours passed this way, until he opened his eyes and saw a square of light before them. The trip was over.

His legs were stiff and galled with saddle sores. After his feet were untied getting down was an

effort, and he almost fell. A door opened and Jason went in. It took his eyes some moments to get used to the light, until he could make out the form of a man on the bed before him.

"Come over here and sit down." The voice was full and strong, accustomed to command. The body was that of an invalid. A blanket covered him to the waist, above that the flesh was sickly white, spotted with red nodules, and hung loosely over the bones. There seemed to be nothing left of the man except skin and skeleton.

"Not very nice," the man on the bed said, "but I've grown used to it." His tone changed abruptly. "Naxa said you were from offworld. Is that true?"

Jason nodded yes, and his answer stirred the living skeleton to life. The head lifted from the pillow and the red-rimmed eyes sought his with a desperate intensity.

"My name is Rhes and I'm a . . . grubber. Will you help me?"

Jason wondered at the intensity of Rhes' question, all out of proportion to the simple content of its meaning. Yet he could see no reason to give anything other than the first and obvious answer that sprang to his lips.

"Of course I'll help you, in whatever way I can. As long as it involves no injury to anyone else. What do you want?"

The sick man's head had fallen back limply, exhausted, as Jason talked. But the fire still burned in the eyes.

"Feel assured . . . I want to injure no others," Rhes said. "Quite the opposite. As you see I am suffering from a disease that our remedies will not stop. Within a few more days I will be dead. Now I have seen . . . the city people . . . using a device, they press it over a wound or an animal bite. Do you have one of these machines?"

"That sounds like a description of the medikit." Jason touched the button at his waist that dropped the medikit into his hand. "I have mine here. It analyzes and treats most . . ."

"Would you use it on me?" Rhes broke in, his voice suddenly urgent.

"I'm sorry," Jason said. "I should have realized." He stepped forward and pressed the machine over one of the inflamed areas on Rhes' chest. The operation light came on and the thin shaft of the analyzer probe slid down. When it withdrew the device hummed, then clicked three times as three separate hypodermic needles lanced into the skin. Then the light went out.

"Is that all?" Rhes asked, as he watched Jason stow the medikit back in his belt.

Jason nodded, then looked up and noticed the wet marks of tears on the sick man's face. Rhes became aware at the same time and brushed at them angrily.

"When a man is sick," he growled, "the body and all its senses become traitor. I don't think I have cried since I was a child—but you must realize it's not myself I'm crying for. It's the untold thousands of my people who have died for lack of that little device you treat so casually."

"Surely you have medicines, doctors of your own?"

"Herb doctors and witch doctors," Rhes said, consigning them all to oblivion with a chop of his hand. "The few hard working and honest men are hampered by the fact that the faith healers can usually cure better than their strongest potion."

The talking had tired Rhes. He stopped suddenly and closed his eyes. On his chest, the inflamed areas were already losing their angry color as the injections took affect. Jason glanced around the room, looking for clues to the mystery of these people.

Floor and walls were made of wood lengths fitted together, free of paint or decoration. They looked simple and crude, fit only for the

savages he had expected to meet. Or were they crude? The wood had a sweeping, flamelike grain. When he bent close he saw that wax had been rubbed over the wood to bring out this pattern. Was this the act of savages—or of artistic men seeking to make the most of simple materials? The final effect was far superior to the drab paint and riveted steel rooms of the city-dwelling Pyrrans. Wasn't it true that both ends of the artistic scale were dominated by simplicity? The untutored aborigine made a simple expression of a clear idea, and created beauty. At the other extreme, the sophisticated critic rejected over-elaboration and decoration and sought the truthful clarity of uncluttered art. At which end of the scale was he looking now?

These men were savages, he had been told that. They dressed in furs and spoke a slurred and broken language, at least Naxa did. Rhes admitted he preferred faith healers to doctors. But, if all this were true, where did the communicator fit into the picture? Or the glowing ceiling that illuminated the room with a soft light?

Rhes opened his eyes and stared at Jason, as if seeing him for the first time. "Who are you?" he asked. "And what are you doing here?"

There was a cold menace in his words and Jason understood why. The city Pyrrans hated the "grubbers" and, without a doubt, the feeling was mutual. Naxa's ax had proved that. Naxa had entered silently while they talked, and stood with his fingers touching the haft of this same ax. Jason knew his life was still in jeopardy, until he gave an answer that satisfied these men.

He couldn't tell the truth. If they once suspected he was spying among them to aid the city people, it would be the end. Nevertheless, he had to be free to talk about the survival problem.

The answer hit him as soon as he had stated the problem. All this had only taken an instant to consider, as he turned back to face the invalid, and he answered at once. Trying to keep his voice normal and unconcerned.

"I'm Jason dinAlt, an ecologist, so you see I have the best reasons in the universe for visiting this planet—"

"What is an ecologist?" Rhes broke in. There was nothing in his voice to indicate whether he meant the question seriously, or as a trap. All traces of the ease of their earlier conversation were gone, his voice had the deadliness of a stingwing's poison. Jason chose his words carefully.

"Simply stated, it is that branch of biology that considers the relations between organisms and their environment. How climatic and other factors affect the life forms, and how the life forms in turn affect each other and the environment." That much Jason knew was true—but he really knew very little more

about the subject so he moved on quickly.

"I heard reports of this planet, and finally came here to study it firsthand. I did what work I could in the shelter of the city, but it wasn't enough. The people there think I'm crazy, but they finally agreed to let me make a trip out here."

"What arrangements have been made for your return?" Naxa snapped.

"None" Jason told him. "They seemed quite sure that I would be killed instantly and had no hope of me coming back. In fact, they refused to let me go and I had to break away."

This answer seemed to satisfy Rhes and his face cracked into a mirthless smile. "They would think that, those junkmen. Can't move a meter outside their own walls without an armor-plated machine as big as a barn. What did they tell you about us?"

Again Jason knew a lot depended on his answer. This time he thought carefully before speaking.

"Well . . . perhaps I'll get that ax in the back of my neck for saying this . . . but I have to be honest. You must know what they think. They told me you were filthy and ignorant savages who smelled. And you . . . well, had curious customs you practiced with the animals. In exchange for food, they traded you beads and knives . . ."

Both Pyrrans broke into a convulsion of laughter at this. Rhes stopped soon, from weakness, but Naxa laughed himself into a coughing fit and had to splash water over his head from a gourd jug.

"That I believe well enough," Rhes said, "it sounds like the stupidity they would talk. Those people know nothing of the world they live in. I hope the rest of what you said is true, but even if it is not, you are welcome here. You are from off-world, that I know. No junkman would have lifted a finger to save my life. You are the first off-worlder my people have ever known and for that you are doubly welcome. We will help you in any way we can. My arm is your arm."

These last words had a ritual sound to them, and when Jason repeated them, Naxa nodded at the correctness of this. At the same time, Jason felt that they were more than empty ritual. Interdependence meant survival on Pyrrus, and he knew that these people stood together to the death against the mortal dangers around them. He hoped the ritual would include him in that protective sphere.

"That is enough for tonight," Rhes said. "The spotted sickness had weakened me, and your medicine has turned me to jelly. You will stay here, Jason. There is a blanket, but no bed at least for now."

Enthusiasm had carried Jason this far, making him forget the two gee exertions of the long day. Now fatigue hit him a physical blow. He had dim memories of refusing food and rolling in the blanket on the floor. After that, oblivion.

## XVII.

Every square inch of his body ached where the doubled gravity had pressed his flesh to the unyielding wood of the floor. His eyes were gummy and his mouth was filled with an indescribable taste that came off in chunks. Sitting up was an effort and he had to stifle a groan as his joints cracked.

"Good day, Jason," Rhes called from the bed. "If I didn't believe in medicine so strongly, I would be tempted to say there is a miracle in your machine that has cured me overnight."

There was no doubt that he was on the mend. The inflamed patches had vanished and the burning light was gone from his eyes. He sat, propped up on the bed, watching the morning sun melt the night's hailstorm into the fields.

"There's meat in the cabinet there," he said, "and either water or visk to drink."

The visk proved to be a distilled beverage of extraordinary potency that instantly cleared the fog from Jason's brain, though it did leave a slight ringing in his ears. And the meat was a tenderly smoked joint, the best food he had tasted since leaving Darkhan. Taken together they restored his faith in life and the future. He lowered his glass with a relaxed sigh and looked around.

With the pressures of immediate survival and exhaustion removed, his thoughts returned automatically to his problem. What were these people really like—and how had they managed to survive in the deadly wilderness? In the city he had been told they were savages. Yet there was a carefully tended and repaired communicator on the wall. And by the door a crossbow—that fired machined metal bolts, he could see the tool marks still visible on their shanks. The one thing he needed was more information. He could start by getting rid of some of his misinformation.

"Rhes, you laughed when I told you what the city people said, about trading you trinkets for food. What do they really trade you?"

"Anything within certain limits," Rhes said. "Small manufactured items, such as electronic components for our communicators. Rustless alloys we can't make in our forges, cutting tools, atomic electric converters that produce power from any radioactive element. Things like that. Within reason they'll trade anything we ask that isn't on the forbidden list. They need the food badly."

"And the items on the forbidden list—?"

"Weapons, of course, or anything that might be made into a powerful weapon. They know we make gunpowder so we can't get anything like large castings or seamless tubing we could make into heavy gun barrels. We drill our own rifle barrels by hand, though the crossbow is quiet and faster in the jungle. Then they don't like us to know very much, so the only reading matter that gets to

us are tech maintenance manuals, empty of basic theory.

"The last banned category you know about—medicine. This is the one thing I cannot understand, that makes me burn with hatred with every death they might have prevented."

"I know their reasons," Jason said.

"Then tell me, because I can think of none."

"Survival—it's just that simple. I doubt if you realize it, but they have a decreasing population. It is just a matter of years before they will be gone. Whereas your people at least must have a stable—if not slightly growing population—to have existed without their mechanical protections. So in the city they hate you and are jealous of you at the same time. If they gave you medicine and you prospered, you would be winning the battle they have lost. I imagine they tolerate you as a necessary evil, to supply them with food, otherwise they wish you were all dead."

"It makes sense," Rhes growled, slamming his fist against the bed. "The kind of twisted logic you expect from junkmen. They use us to feed them, give us the absolute minimum in return, and at the same time cut us off from the knowledge that will get us out of this hand to mouth existence Worse, far worse, they cut us off from the stars and the rest of mankind." The hatred on his face was so strong that Jason unconsciously drew back.

"Do you think we are savages here, Jason? We act and look like animals because we have to fight for existence on an animal level. Yet we know about the stars. In that chest over there, sealed in metal, are over thirty books, all we have. Fiction most of them, with some history and general science thrown in. Enough to keep alive the stories of the settlement here and the rest of the universe outside. We see the ships land in the city and we know that up there are worlds we can only dream about and never see. Do you wonder that we hate these beasts that call themselves men, and would destroy them in an instant if we could? They are right to keep weapons from us—for sure as the sun rises in the morning we would kill them to a man if we were able, and take over the things they have withheld from us."

It was a harsh condemnation, but essentially a truthful one. At least from the point of view of the outsiders. Jason didn't try to explain to the angry man that the city Pyrrans looked on their attitude as being the only possible and logical one. "How did this battle between your two groups ever come about?" he asked.

"I don't know," Rhes said, "I've thought about it many times, but there are no records of that period. We do know that we are all descended from colonists who arrived at the same time. Somewhere, at some time, the two groups separated. Perhaps it was a war, I've read about

them in the books. I have a partial theory, though I can't prove it, that it was the location of the city."

"Location—I don't understand."

"Well, you know the junkmen, and you've seen where their city is. They managed to put it right in the middle of the most savage spot on this planet. You know they don't care about any living thing except themselves, shoot and kill is their only logic. So they wouldn't consider where to build their city, and managed to build it in the stupidest spot imaginable. I'm sure my ancestors saw how foolish this was and tried to tell them so. That would be reason enough for a war, wouldn't it?"

"It might have been—if that's really what happened," Jason said. "But I think you have the problem turned backwards. It's a war between native Pyrran life and humans, each fighting to destroy the other. The life forms change continually, seeking that final destruction of the invader."

"Your theory is even wilder than mine," Rhes said. "That's not true at all. I admit that life isn't too easy on this planet . . . if what I have read in the books about other planets is true . . . but it doesn't change. You have to be fast on your feet and keep your eyes open for anything bigger than you, but you can survive. Anyway, it doesn't really matter why. The junkmen always look for trouble and I'm happy to see that they have enough."

Jason didn't try to press the point. The effort of forcing Rhes to change

his basic attitudes wasn't worth it -- even if possible. He hadn't succeeded in convincing anyone in the city of the lethal mutations even when they could observe all the facts. Rhes could still supply information though.

"I suppose it's not important who started the battle," Jason said for the other man's benefit, not meaning a word of it, "but you'll have to agree that the city people are permanently at war with all the local life. Your people, though, have managed to befriend at least two species that I have seen. Do you have any idea how this was done?"

"Naxa will be here in a minute," Rhes said, pointing to the door, "as soon as he's taken care of the animals. Ask him. He's the best talker we have."

"Talker?" Jason asked. "I had

the opposite idea about him. He didn't talk much, and what he did say was, well . . . a little hard to understand at times."

"Not that kind of talking," Rhes broke in impatiently. "The talkers look after the animals. They train the dogs and doryms, and the better ones like Naxa are always trying to work with other beasts. They dress crudely, but they have to. I've heard them say that the animals don't like chemicals, metal or tanned leather, so they wear untanned furs for the most part. But don't let the dirt fool you, it has nothing to do with his intelligence."

"Doryms? Are those your carrying beasts—the kind we rode coming here?"

Rhes nodded. "Doryms are more than pack animals, they're really a little bit of everything. The large males pull the plows and other machines, while the younger animals are used for meat. If you want to know more, ask Naxa, you'll find him in the barn."

"I'd like to do that," Jason said, standing up. "Only I feel undressed without my gun—"

"Take it, by all means, it's in that chest by the door. Only watch out what you shoot around here."

Naxa was in the rear of the barn, filing down one of the spadelike toenails of a dorym. It was a strange scene. The fur-dressed man with the great beast—and the contrast of a berrylium-copper file and electroluminescent plates lighting the work.

The dorym opened its nostrils and pulled away when Jason entered; Naxa patted its neck and talk-

ed softly until it quieted and stood still, shivering slightly.

Something stirred in Jason's mind, with the feeling of a long unused muscle being stressed. A hauntingly familiar sensation.

"Good morning," Jason said. Naxa grunted something and went back to his filing. Watching him for a few minutes, Jason tried to analyze this new feeling. It itched and slipped aside when he reached for it, escaping him. Whatever it was, it had started when Naxa had talked to the dorym.

"Could you call one of the dogs in here, Naxa? I'd like to see one closer up."

Without raising his head from his work, Naxa gave a low whistle. Jason was sure it couldn't have been heard outside of the barn. Yet within a minute one of the Pyrran dogs slipped quietly in. The talker rubbed the beast's head, mumbling to it, while the animal looked intently into his eyes.

The dog became restless when Naxa turned back to work on the dorym. It prowled around the barn, sniffing, then moved quickly towards the open door. Jason called it back.

At least he meant to call it. At the last moment he said nothing. Nothing aloud. On sudden impulse he kept his mouth closed—only he called the dog with his mind. Thinking the words *come here,* directing the impulse at the animal with all the force and direction he had ever used to manipulate dice. As he did it he realized it had been a long time since he had even considered using his psi powers.

The dog stopped and turned back towards him.

It hesitated, looking at Naxa, then walked over to Jason.

Seen this closely the beast was a nightmare hound. The hairless protective plates, tiny red-rimmed eyes, and countless, saliva-dripping teeth did little to inspire confidence. Yet Jason felt no fear. There was a rapport between man and animal that was understood. Without conscious thought he reached out and scratched the dog along the back, where he knew it itched.

"Didn't know y're a talker," Naxa said. As he watched them, there was friendship in his voice for the first time.

"I didn't know either—until just now," Jason said. He looked into the eyes of the animal before him, scratched the ridged and ugly back, and began to understand.

The talkers must have well developed psi facilities, that was obvious now. There is no barrier of race or alien form when two creatures share each other's emotions. Empathy first, so there would be no hatred or fear. After that direct communication. The talkers might have been the ones who first broke through the barrier of hatred on Pyrrus and learned to live with the native life. Others could have followed their example—this might explain how the community of "grubbers" had been formed.

Now that he was concentrating on it, Jason was aware of the soft flow

of thoughts around him. The consciousness of the dorym was matched by other like patterns from the rear of the barn. He knew without going outside that more of the big beasts were in the field back there.

"This is all new to me," Jason said. "Have you ever thought about it, Naxa? What does it feel like to be a talker? I mean, do you *know* why it is you can get the animals to obey you while other people have no luck at all?"

Thinking of this sort troubled Naxa. He ran his fingers through his thick hair and scowled as he answered. "Nev'r thought about it. Just do it. Just get t'know the beast real good, then y'can guess what they're going t'do. That's all."

It was obvious that Naxa had never thought about the origin of his ability to control the animals. And if he hadn't—probably no one else had. They had no reason to. They simply accepted the powers of talkers as one of the facts of life.

Ideas slipped towards each other in his mind, like the pieces of a puzzle joining together. He had told Kerk that the native life of Pyrrus had joined in battle against mankind, he didn't know why. Well—he still didn't know why, but he was gettting an idea of the "how."

"About how far are we from the city?" Jason asked. "Do you have an idea how long it would take us to get there by dorym?"

"Half a day there—half back. Why? Y'want to go?"

"I don't want to get into the city, not yet. But I would like to get close to it," Jason told him.

"See what Rhes say," was Naxa's answer.

Rhes granted instant permission without asking any questions. They saddled up and left at once, in order to complete the round trip before dark.

They had been traveling less than an hour before Jason knew they were going in the direction of the city. With each minute the feeling grew stronger. Naxa was aware of it too, stirring in the saddle with unvoiced feelings. They had to keep touching and reassuring their mounts which were growing skittish and restless.

"This is far enough," Jason said. Naxa gratefully pulled to a stop.

The wordless thought beat through Jason's mind, filling it. He could feel it on all sides—only much stronger ahead of them in the direction of the unseen city. Naxa and the doryms reacted in the same way, restlessly uncomfortable, not knowing the cause.

One thing was obvious now. The Pyrran animals were sensitive to psi radiation—probably the plants and lower life forms as well. Perhaps they communicated by it, since they obeyed the men who had a strong control of it. And in this area was a wash of psi radiation such as he had never experienced before. Though his personal talents specialized in psychokinesis—the mental control of inanimate matter—he was still sensitive to most mental phenomena. Watching a

sports event he had many times felt the unanimous accord of many minds expressing the same thought. What he felt now was like that.

Only terribly different. A crowd exulted at some success on the field, or groaned at a failure. The feeling fluxed and changed as the game progressed. Here the wash of thought was unending, strong and frightening. It didn't translate into words very well. It was part hatred, part fear—and all destruction.

*"KILL THE ENEMY"* was as close as Jason could express it. But it was more than that. An unending river of mental outrage and death.

"Let's go back now," he said, suddenly battered and sickened by the feelings he had let wash through him. As they started the return trip he began to understand many things.

His sudden unspeakable fear when the Pyrran animal had attacked him that first day on the planet. And his recurrent nightmares that had never completely ceased, even with drugs. Both of these were his reaction to the hatred directed at the city. Though for some reason he hadn't felt it directly up to now, enough had reached through to him to get a strong emotional reaction.

Rhes was asleep when they got back and Jason couldn't talk to him until morning. In spite of his fatigue from the trip, he stayed awake late into the night, going over in his mind the discoveries of the day. Could he tell Rhes what he had found out? Not very well. If he did that, he would have to explain the importance of his discovery and what he meant to use it for. Nothing that aided the city dwellers would appeal to Rhes in the slightest. Best to say nothing until the entire affair was over.

## XVIII.

After breakfast he told Rhes that he wanted to return to the city.

"Then you have seen enough of our barbarian world, and wish to go back to your friends. To help them wipe us out perhaps?" Rhes said it lightly, but there was a touch of cold malice behind his words.

"I hope you don't really think that," Jason tod him. "You must realize that the opposite is true. I would like to see this civil war ended and your people getting all the benefits of science and medicine that have been withheld. I'll do everything I can to bring that about."

"They'll never change," Rhes said gloomily, "so don't waste your time. But there is one thing you must do, for your protection and ours. Don't admit, or even hint, that you've talked to any grubbers!"

"Why not?"

"Why not! Suffering death are you that simple! They will do anything to see that we don't rise too high, and would much prefer to see us all dead. Do you think they would hesitate to kill you if they as much as suspected you had contacted us? They realize—even if you don't—that you can singlehandedly alter the entire pattern of power on this planet. The

ordinary junkman may think of us as being only one step above the animals, but the leaders don't. They know what we need and what we want. They could probably guess just what it is I am going to ask you.

"Help us, Jason dinAlt. Get back among those human pigs and lie. Say you never talked to us, that you hid in the forest and we attacked you and you had to shoot to save yourself. We'll supply some recent corpses to make that part of your story sound good. Make them believe you, and even after you think you have them convinced keep on acting the part because they will be watching you. Then tell them you have finished your work and are ready to leave. Get safely off Pyrrus, to another planet, and I promise you anything in the universe. Whatever you want you shall have. Power, money —*anything*.

"This is a rich planet. The junkmen mine and sell the metal, but we could do it much better. Bring a spaceship back here and land anywhere on this continent. We have no cities, but our people have farms everywhere, they will find you. We will then have commerce, trade—on our own. This is what we all want and we will work hard for it. And *you* will have done it. Whatever you want we will give. That is a promise and we do not break our promises."

The intensity and magnitude of what he described rocked Jason. He knew that Rhes spoke the truth and the entire resources of the planet would be his, if he did as asked. For one second he was tempted, savoring the thought of what it would be like. Then came realization that it would be a half answer, and a poor one at that. If these people had the strength they wanted, their first act would be the attempted destruction of the city men. The result would be bloody civil war that would probably destroy them both. Rhes' answer was a good one—but only half an answer.

Jason had to find a better solution. One that would stop *all* the fighting on this planet and allow the two groups of humans to live in peace.

"I will do nothing to injure your people, Rhes—and everything in my power to aid them," Jason said.

This half answer satisfied Rhes, who could see only one interpretation of it. He spent the rest of the morning on the communicator, arranging for the food supplies that were being brought to the trading site.

"The supplies are ready and we have sent the signal," he said. "The truck will be there tomorrow and you will be waiting for it. Everything is arranged as I told you. You'll leave now with Naxa. You must reach the meeting spot before the trucks."

## XIX.

"Trucks almost here. Y'know what to do?" Naxa asked.

Jason nodded, and looked again at the dead man. Some beast had torn his arm off and he had bled to death. The severed arm had been tied into the shirt sleeve, so from a distance it looked normal. Seen close up this

limp arm, plus the white skin and shocked expression on the face, gave Jason an unhappy sensation. He liked to see his corpses safely buried. However he could understand its importance today.

"Here they're. Wait until his back's turned," Naxa whispered.

The armored truck had three powered trailers in tow this time. The train ground up the rock slope and whined to a stop. Krannon climbed out of the cab and looked carefully around before opening up the trailers. He had a lift robot along to help him with the loading.

"Now!" Naxa hissed.

Jason burst into the clearing, running, shouting Krannon's name. There was a crackling behind him as two of the hidden men hurled the corpse through the foliage after him. He turned and fired without stopping, setting the thing afire in midair.

There was the crack of another gun as Krannon fired, his shot jarred the twice-dead corpse before it hit the ground. Then he was lying prone, firing into the trees behind the running Jason.

Just as Jason reached the truck there was a whirring in the air and hot pain ripped into his back, throwing him to the ground. He looked around as Krannon dragged him through the door, and saw the metal shaft of a crossbow bolt sticking out of his shoulder.

"Lucky," the Pyrran said. "An inch lower would have got your heart. I warned you about those grubbers. You're lucky to get off with only this." He lay next to the door and snapped shots into the now quiet wood.

Taking out the bolt hurt much more than it had going in. Jason cursed the pain as Krannon put on a dressing, and admired the singleness of purpose of the people who had shot him. They had risked his life to make his escape look real. And also risked the chance that he might turn against them after being shot. They did a job completely and thoroughly and he cursed them for their efficiency.

Krannon climbed warily out of the truck, after Jason was bandaged. Finishing the loading quickly, he started the train of trailers back towards the city. Jason had an anti-pain shot and dozed off as soon as they started.

While he slept, Krannon must have radioed ahead, because Kerk was waiting when they arrived. As soon as the truck entered the perimeter he threw open the door and dragged Jason out. The bandage pulled and Jason felt the wound tear open, He ground his teeth together; Kerk would not have the satisfaction of hearing him cry out.

"I told you to stay in the buildings until the ship left. Why did you leave? Why did you go outside? You talked to the grubbers—didn't you?" With each question he shook Jason again.

"I didn't talk to—anyone." Jason managed to get the words out. "They tried to take me, I shot two—hid out until the trucks came back."

"Got another one then," Krannon said. "I saw it. Good shooting. Think I got some, too. Let him go Kerk, they shot him in the back before he could reach the truck."

*That's enough explanations* Jason thought to himself. *Don't overdo it. Let him make up his mind later. Now's the time to change the subject. There's one thing that will get his mind off the grubbers.*

"I've been fighting your war for you Kerk, while you stayed safely inside the perimeter." Jason leaned back against the side of the truck as the other loosened his grip. "I've found out what your battle with this planet is really about—and how you can win it. Now let me sit down and I'll tell you."

More Pyrrans had come up while they talked. None of them moved now. Like Kerk, they stood frozen, looking at Jason. When Kerk talked, he spoke for all of them.

*"What do you mean?"*

"Just what I said. Pyrrus is fighting you—actively and consciously. Get far enough out from this city and you can feel the waves of hatred that are directed at it. No, that's wrong—you can't because you've grown up with it. But I can, and so could anyone else with any sort of psi sensitivity. There is a message of war being beamed against you constantly. The life forms of this planet are psi-sensitive, and respond to that order. They attack and change and mutate for your destruction. And they'll keep on doing so until you are all dead. Unless you can stop the war."

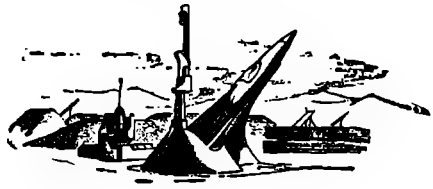
"How?" Kerk snapped the word and every face echoed the question.

"By finding whoever or whatever is sending that message. The life forms that attack you have no reasoning intelligence. They are being ordered to do so. I think I know how to find the source of these orders. After that it will be a matter of getting across a message, asking for a truce and an eventual end to all hostilities."

A dead silence followed his words as the Pyrrans tried to comprehend the ideas. Kerk moved first, waving them all away.

"Go back to your work. This is my responsibility and I'll take care of it. As soon as I find out what truth there is here—if any—I'll make a complete report." The people drifted away silently, looking back as they went.

TO BE CONCLUDED



# THE LEADER

By MURRAY LEINSTER

*The trouble with being a Superman, with Super powers, and knowing it, is it's so easy to overlook the unpleasant possibility of a super-superman!*

Illustrated by van Dongen

. . . The career of The Leader remains one of the mysteries of history. This man, illegitimate and uneducated, hysterical and superstitious, gathered about him a crowded following of those who had been discontented, but whom he turned into fanatics. Apparently by pure force of personality he seized without resistance the government of one of the world's great nations. So much is unlikely enough. But as the ruler of a civilized country he imposed upon its people the absolute despotism of a primitive sultanate. He honeycombed its society with spies. He imprisoned, tortured, and executed without trial or check. And while all this went on he received the most impassioned loyalty of his subjects! Morality was abandoned at his command with as much alacrity as common sense. He himself was subject to the grossest superstitions. He listened to astrologers and fortunetellers—and executed them when they foretold disaster. But it is not enough to be amazed at the man himself. The great mystery is that people of the Twentieth Century, trained in science and technically advanced, should join in this orgy of what seems mere madness . . .

*Concise History of Europe.* Blaisdell.

Letter from Professor Albrecht Aigen, University of Brunn, to the Herr General Johann von Steppberg, retired.

My dear General von Steppberg:

It is with reluctance that I intrude upon your retirement, but at the request of the Government I have undertaken a scientific examination of the causes which brought about The Leader's rise to power, the extraordinary popularity of his regime, the impassioned loyalty he was able to evoke, and the astounding final developments.

If you can communicate to me any memories of The Leader which may aid in understanding this most bewildering period of our history, I assure you that it will be appreciated by myself, by the authorities who wish the investigation made, and I dare to hope by posterity.

I am, my dear general, (Et cetera.)

Letter from General Johann von Steppberg (Retired) to Professor Albrecht Aigen, University of Brunn.

Herr Professor:

The official yearbooks of the army contain the record of my military career. I have nothing to add to that information. You say the authorities wish more. I refuse it. If they threaten my pension, I will renounce it. If they propose other pressures, I will leave the country. In short, I refuse to discuss in any manner the subject of your recent communication.

I am, Herr Professor, (Et cetera.)

Letter from Professor Albrecht Aigen to Dr. Karl Thurn, Professor of Psychology at University of Laibach.

My dear Karl:

I hope your psionic research goes better than my official project! My business goes nowhere! I have written to generals, ministers, and all kinds of persons who held high office under The Leader. Each and every one refuses to discuss The Leader or his own experiences under him. Why? Surely no one would blame them now! We have had to agree to pretend that no one did anything improper under The Leader, or else

that what anyone did was proper at the time. So why should the nabobs of that incredible period refuse to discuss what they should know better than anyone else? I am almost reduced to asking the aid of the astrologers and soothsayers The Leader listened to. Actually, I must make a note to do so in sober earnest. At least they had their own viewpoint of events.

Speaking of viewpoints, I have had some hope of clarifying The Leader's career by comparing it with that of Prime Minister Winston, in power in his country when The Leader ruled ours. His career is splendidly documented. There is astonishingly little documentation about The Leader as a person, however. That is one of the difficulties of my task. Even worse, those who should know him best lock their lips while those—

Here is an unsolicited letter from the janitor of a building in which a former Minister of Education now has his law offices. I have many letters equally preposterous . . .

Enclosure in letter to Dr. Karl Thurn, University of Laibach.
Herr Professor:

I am the janitor of the building in which Herr Former Minister of Education Werfen has his offices. In cleaning there I saw a letter crumpled into a ball and thrown into a corner. I learned in the time of The Leader that angry actions often mean evil intentions, so I read the letter to see if the police should be notified. It was a letter from you in which you asked Herr Former Minister of Education Werfen for his memories of The Leader.

I remember The Leader, Herr Professor. He was the most holy man who ever lived, if indeed he was only a man. Once I passed the open door of an office in the building I then worked in. I looked in the door—it was the office of the then-struggling Party The Leader had founded—and I saw The Leader sitting in a chair, thinking. There was golden light about his head, Herr Professor. I have told this to other people and they do not believe me. There were shadowy other beings in the room. I saw, very faintly, great white wings. But the other beings were still because The Leader was thinking and did not wish to be disturbed. I assure you that this is true, Herr Professor. The Leader was the holiest of men—if he was only a man.

I am most respectfully, Herr Professor, (Et cetera.)

Letter from Fraulein Lise Grauer, nurse, in the city of Bludenz, to Professor Aigen at Brunn University.
Most respected Herr Professor:

I write this at the request of the Herr Former Police Inspector Grieg, to whom you directed a letter shortly before his death. The Herr Former Police Inspector had been ill for some time. I was his nurse. I had cared for him for months and did many small services for him, such as writing letters at his direction.

When your letter came he read it and went into a black mood of deep

and bitter recollection. He would not speak for hours, and I had great difficulty in getting him to take his medicines. Just before his bedtime he called me and said sardonically;

"Lise, write to this Herr Professor for me. Say to him that I was once a decent man. When The Leader took power, I received orders that I would not accept. I submitted my resignation. Then I received orders to come to The Leader. I obeyed these orders because my resignation was not yet accepted. I was received in his office. I entered it with respect and defiance —respect because he was admitted to be the ruler of our nation; defiance because I would not obey such orders as had been sent me in his name.

"The Leader spoke to me, kindly, and as he spoke all my views changed. It suddenly seemed that I had been absurd to refuse the orders sent me. They seemed right and reasonable and even more lenient than would have been justified. . . . I left The Leader in a state in which I could not possibly fail to do anything he wished. From that moment I obeyed his orders. I was promoted. Eventually, as you know, I was in command of the Neusatz prison camp. And you know what orders I carried out there!"

I wept, Herr Professor, because the Herr Grieg's eyes were terrible to look at. He was a gentle and kindly man, Herr Professor! I was his nurse, and he was a good patient and a good man in every way. I had heard of the things that were done at Neusatz, but I could not believe that my patient had commanded them. Now, in his eyes I saw that he remembered them and that the memory was intolerable. He said very bitterly:

'Tell the Herr Professor that I can tell him nothing more. I have no other memories that would be of service to him. I have resolved, anyhow, to get rid even of these. I have kept them too long. Say to him that his letter has decided me."

I did not understand what he meant, Herr Professor. I helped him prepare for the night, and when he seemed to be resting quietly I retired, myself. I was wakened by a very loud noise. I went to see what was the matter. The Herr Former Police Inspector Grieg had managed to get out of his bed and across the room to a bureau. He opened a drawer and took out a revolver. He made his way back to his bed. He blew out his brains.

I called the police, and after investigation they instructed me to carry out his request, which I do.

Herr Professor, I do not myself remember the times of The Leader, but they must have been very terrible. If the Herr Former Police Inspector Grieg was actually in command of the Neusatz prison camp, and did actually order the things done there, —I cannot understand it, Herr Professor! Because he was a good and kindly man! If you write of him, I beg that you will mention that he was a most amiable man. I was only his nurse, but I assure you— (Et cetera.)

Letter from Dr. Karl Thurn, University of Laibach, to Professor Albrecht Aigen, University of Brunn.

My dear friend:

I could have predicted your failure to secure co-operation from eminent figures in The Leader's regime. So long as they keep silent, together, they can pretend to be respectable. And nobody longs so passionately to be respectable as a man who has prospered by being a swine, while he awaits an opportunity to prosper again by more swinishness. I would advise you to expect your best information from little people who suffered most and most helplessly looked on or helped while enormities were committed. Such little people will either yearn over the past like your janitor, or want most passionately to understand so that nothing of the sort can ever happen again.

Winston as a parallel to The Leader? Or as a contrast? Which? I can name one marked contrast. I doubt that anybody really and passionately wishes that Winston had never been born.

You mention my researches. You should see some of our results! I have found a rat with undeniable psychokinetic power. I have seen him move a gram-weight of cheese nearly three centimeters to where he could reach it through the cage bars. I begin to suspect a certain female dog of abilities I would prefer not to name just yet. If you can find any excuse to come to Laibach, I promise you amazing demonstrations of psi phenomena. (Et cetera.)

Quotations from, *"Recollections of the Earl of Humber, formerly Prime Minister Winston,"* by the Hon. Charles Wilberforce.

Page 231; ". . . This incredible event took place even while it seemed most impossible. The Prime Minister took it with his usual aplomb. I asked him what he thought of the matter a week later, at a house party in Hertsfordsire. He said, 'I consider it most unfortunate. This Leader of theirs is an inherently nasty individual. Therefore he'll make nastiness the avenue to distinction so long as he's in power. The results will be tragic, because when you bottle up decency men seem to go mad. What a pity one can't bottle up nastiness! The world might become a fit place to live in!' "

Page 247. "The Prime Minister disagreed. 'There was Napoleon, he observed. 'You might despise him, but after he talked to you you served him. He seemed to throw a spell over people. Alexander probably had the same sort of magic personality. When his personality ceased to operate, as a result of too much wine too continuously, his empire fell immediately to pieces. I've known others personally; an Afghan whom I've always thought did us a favor by getting killed by a sniper. He could have caused a great deal of trouble. I'd guess at the Khalifa. Most of the people who have this incredible persuasiveness, however, seem to set up as successful swindlers. What a pity The Leader had no taste for simple

crime, and had to go in for crimes of such elaboration!' "

Letter from Professor Albrecht Aigen, University of Brunn, to Dr. Karl Thurn, University of Laibach.
My dear Karl:

You make me curious with your talk of a rat which levitates crumbs of cheese and a she-dog who displays other psi abilities. I assume that you have found the experimental conditions which let psi powers operate without hindrance. I shall hope some day to see and conceivably to understand.

My own affairs are in hopeless confusion. At the moment I am overwhelmed with material about The Leader, the value of which I cannot estimate. Strange! I ask people who should know what I am commissioned to discover, and they refuse to answer. But it becomes known that I ask, and thousands of little people write me to volunteer impassioned details of their experiences while The Leader ruled. Some are bitter because they did what they did and felt as they felt. These seem to believe in magic or demoniac possession as the reason they behaved with such conspicuous insanity. Others gloat over their deeds, which they recount with gusto—and then express pious regret with no great convincingness. Some of these accounts nauseate me. But something utterly abnormal was in operation, somehow, to cause The Leader's ascendancy!

I wish I could select the important data with certainty. Almost anything, followed up, might reveal the key. But I do not know what to follow! I plan to go to Bozen, where the new monstrous computer has been set up, and see if there is any way in which it could categorize my data and detect a pattern of more than bewildered and resentful frenzy.

On the way back to Brunn I shall stop by to talk to you. There is so much to say! I anticipate much of value from your detached and analytic mind. I confess, also, that I am curious about your research. This she-dog with psi powers, of which you give no account . . . I am intrigued.

As always, I am, (Et cetera.)

Letter from Professor Albrecht Aigen, written from The Mathematical Institute at Bozen, to Dr. Karl Thurn, University of Laibach.
My dear Karl:

This is in haste. There is much agitation among the computer staff at the Institute. An assistant technician has been discovered to be able to predict the answer the computer will give to problems set up at random. He is one Hans Schweeringen and it is unbelievable.

Various numerals are impressed on the feed-in tape of the computer. Sections of the tape are chosen at random by someone who is blindfolded. They are fed unread into the computer, together with instructions to multiply, subtract, extract roots, et cetera, which are similarly chosen at random and not known to anyone. Once in twenty times or so, Schweer-

ingen predicts the result of this meaningless computation before the computer has made it. This is incredible! The odds are trillions to one against it! Since nobody knows the sums or instructions given to the computer, it cannot be mind-reading in any form. It must be pure precognition. Do you wish to talk to him?

He is uneasy at the attention he attracts, perhaps because his father was one of The Leader's secretaries and was executed, it is presumed, for knowing too much. Telegraph me if you wish me to try to bring him to you.

Your friend—

Telegram from Dr. Karl Thurn, Professor of Psychology at Laibach University, to Professor Albrecht Aigen, in care of The Mathematical Institute at Bozen:

Take tapes which produced answers Schweeringen predicted. Run them through computer when he knows nothing of it. Wire result.

Thurn.

Telegram. Professor Albrecht Aigen, at The Mathematical Institute in Bozen, to Dr. Karl Thurn, University of Laibach.

How did you know? The tapes do not give the same answers when run through the computer without Schweeringen's knowledge. The only possible answer is that the computer sometimes errs to match his predictions. But this is more impossible than precognition. This is beyond the conceivable. It cannot be! What now?

Aigen.

Telegram from Dr. Karl Thurn, University of Laibach, to Professor Albrecht Aigen, care Mathematical Institute, Bozen.

Naturally I suspect psi. He belongs with my rat and she-dog. Try to arrange it.

Thurn.

Telegram from Professor Albrecht Aigen, Mathematical Institute, Bozen, to Dr. Karl Thurn, University of Laibach.

Schweeringen refuses further tests. Fears proof he causes malfunctioning of computer will cause unemployment here and may destroy all hope of hoped-for career in mathematics.

Aigen.

Telegram from Professor Albrecht Aigen, at Mathematical Institute, to Dr. Karl Thurn, University of Laibach.

Terrible news. Riding bus to Institute this morning, Schweeringen was killed when bus was involved in accident.

Aigen

Telegram from Dr. Karl Thurn, University of Laibach, to Professor Albrecht Aigen, care Mathematical Institute, Bozen.

Deeply regret death Schweeringen. When you come here please try to bring all known family history. Psi ability sometimes inherited. Could be

tie-in his father's execution and use of psi ability.

Thurn.

Letter from Professor Albrecht Aigen, at Brunn University, to Dr. Karl Thurn, University of Laibach.

My dear Karl:

I have first to thank you for your warm welcome and to express my gratitude for your attention while I was your guest. Since my return I have written many inquiries about Schweeringen's father. There are so far no replies, but I have some hope that people who will not tell of their own experiences may tell about someone else—especially someone now dead. This may be a useful device to get at least some information from people who so far have refused any. Naturally I will pass on to you anything I learn.

I try to work again upon the task assigned me—to investigate the rise and power of The Leader. I find it hard to concentrate. My mind goes back to your laboratory. I am deeply shaken by my experience there. I had thought nothing could be more bewildering than my own work. Consider: Today I received a letter in which a man tells me amazedly of the life he led in a slave-labor camp during the time of The Leader's rule. He describes the attempt of another prisoner to organize a revolt of the prisoners. While he spoke of the brutality of the guards and the intolerably hard labor and the deliberately insufficient food, they cheered him. But when he accused The Leader of having ordered these things—the prisoners fell upon him with cries of fury. They killed him. I had this information verified. It was true.

I cannot hope for a sane explanation of such things. But a sane explanation for my experience seems even less probable. I am impressed by your rat who levitates crumbs of cheese. But I am appalled; I am horrified; I am stupefied by what I did! You asked me to wait for you in a certain laboratory beyond a door. I entered. I saw a small, fat, mangy she-dog in a dog-run. She looked at me and wagged her tail. I thereupon went to the other end of the laboratory, opened a box, and took out a handful of strange objects you later told me are sweetmeats to a dog. I gave them to the animal.

Why did I do it? How was it that I went directly to a box of which I knew nothing, opened it as a matter of course, and took out objects I did not even recognize, to give them to that unpleasant small beast? How did I know where to go? Why did I go? Why should I give those then-meaningless objects to the dog? It is as if I were enchanted!

You say that it is a psi phenomenon. The rat causes small objects to move. The dog, you say, causes persons to give it canine candy. I revolt against the conclusion, which I cannot reason away. If you are right, we are at the mercy of our domestic animals! Dog-lovers are not people who love dogs, but people who are enslaved by dogs. Cat-lovers are merely people who have been seized upon by

cats to support and pet and cater to them. This is intolerable! I shall fear all pets from now on! I throw myself back into my own work to avoid thinking of it. I—

Later. I did not mail this letter because an appalling idea occurred to me. This could bear upon my investigation! Do you think The Leader— No! It could not be! It would be madness . . .

Extract from a letter from Dr. Karl Thurn to Professor Albrecht Aigen.

. . . I deplore your reaction. It has the emotional quality of a reaction to witchcraft or magic, but psi is not witchcraft. It is a natural force. No natural force is either nonexistent or irresistible. No natural force is invariably effective. Psi is not irresistible under all circumstances. It is not always effective. My rat cannot levitate cheese-crumbs weighing more than 1.7 grams. My she-dog could not make you give her dog-candy once you were on guard. When you went again into the laboratory she looked at you and wagged her tail as before. You say that you thought of the box and of opening it, but you did not. It was not even an effort of will to refrain.

A lesser will or a lower grade of personality cannot overwhelm a greater one. Not ever! Lesser beings can only urge. The astrologers used to say that the stars incline, but they do not compel. The same can be said of psi—or of magnetism or gravitation or what you will. Schweeringen could not make the computer err when it had to err too egregiously. A greater psi ability was needed than he had. A greater psi power than was available would have been needed to make you give the dog candy, once you were warned.

I do not apply these statements to your so-called appalling idea. I carefully refrain from doing so. It is your research, not mine . . .

Extract from letter to Professor Albrecht Aigen from the Herr Friedrich Holm, supervisor of electrical maintenance, municipal electrical service, Untersberg.

Herr Professor:

You have written to ask if I knew a certain Herr Schweeringen, attached to The Leader's personal staff during his regime. I did know such a person. I was then in charge of electrical maintenance in The Leader's various residences. Herr Schweeringen was officially one of The Leader's secretaries, but his actual task was to make predictions for The Leader, like a soothsayer or a medium. He had a very remarkable gift. There were times when it was especially needful that there be no electrical failures—when The Leader was to be in residence, for example. On such occasions it was my custom to ask Herr Schweeringen if there was apt to be any failure of apparatus under my care. At least three times he told me yes. In one case it was an elevator, in another refrigeration, in a third

a fuse would blow during a State dinner.

I overhauled the elevator, but it failed nevertheless. I replaced the refrigeration motor, and the new motor failed. In the third case I changed the fuse to a new and tested one, and then placed a new, fused line around the fuse Herr Schweeringen had said would blow, and placed a workman beside it. When the fuse did blow as predicted, my workman instantly closed the extra-line switch, so that the lights of the State dinner barely flickered. But I shudder when I think of the result if Herr Schweeringen had not warned me.

He was executed a few days before the period of confusion began, which ended as everyone knows. I do not know the reason for his execution. It was said, however, that The Leader executed him personally. This, Herr Professor, is all that I know of the matter.

Very respectfully, (Et cetera.)

Letter from Herr Theophrastus Paracelsus Bosche, astrologer, to Professor Albrecht Aigen, Brunn University.

Most respected Herr Professor:

I am amused that a so-eminent scientist like yourself should ask information from a so-despised former astrologer to The Leader. It is even more amusing that you ask about a mere soothsayer—a man who displayed an occult gift of prophecy—whom you should consider merely one of

the charlatans like myself whom The Leader consulted, and who are unworthy of consideration by a scientific historian. We have no effect upon history, most respected Herr Professor! None at all. Oh, none! I am much diverted.

You ask about the Herr Schweeringen. He was a predictor, using his occult gift of second sight to foreknow events and tell The Leader about them. You will remember that The Leader considered himself to have occult powers of leadership and decision, and that all occult powers should contribute to his greatness. At times of great stress, such as when The Leader demanded ever-increasing concessions from other nations on threat of war, he was especially concerned that occult predictions promise him success.

At a certain time the international tension was greater than ever before. If The Leader could doubt the rightness of any of his actions, he doubted it then. There was great danger of war. Prime Minister Winston had said flatly that The Leader must withdraw his demands or fight. The Leader was greatly agitated. He demanded my prediction. I considered the stars and predicted discreetly that war would be prevented by some magnificent achievement by The Leader. Truly, if he got out of his then situation it would be a magnificent achievement. But astrology, of course, could only indicate it but not describe what it would be.

The Leader was confident that he could achieve anything he could imagine, because he had convinced even himself that only treason or disloyalty could cause him to fail in any matter. He demanded of his generals what achievement would prevent the war. They were not encouraging. He demanded of his civilian political advisers. They dared not advise him to retreat. They offered nothing. He demanded of his occult advisers.

The Herr Schweeringen demanded of me that I tell him my exact prediction. His nerves were bad, then, and he twitched with the strain. Someone had to describe the great achievement The Leader would make. It would be dangerous not to do so. I told him the prediction, I found his predicament diverting. He left me, still twitching and desperately sunk in thought.

I now tell you exact, objective facts, Herr Professor, with no interpretation of my own upon them. The Herr Schweeringen was closeted with The Leader. I am told that his face was shining with confidence when he went to speak to The Leader. It was believed among us charlatans that he considered that he foreknew what The Leader would do to prevent war at this time.

Two hours later there were shots in The Leader's private quarters. The Leader came out, his eyes glaring, and ordered Herr Schweeringen's body removed. He ordered the execution of the four senior generals of the General Staff, of the Minister of Police, and several other persons. He then went into seclusion, from which he emerged only briefly to give

orders making the unthinkable retreat that Prime Minister Winston had demanded. No one spoke to him for a week. Confusion began. These are objective facts. I now add one small boast.

My discreet prediction had come true, and it is extremely diverting to think about it. The Leader had achieved magnificently. The war was prevented not only for the moment but for later times, too. The Leader's achievement was the destruction of his regime by destroying the brains that had made it operate!

It is quite possible that you will consider this information a lie. That will be quite droll. However, I am, most respected Herr Professor, (Et cetera.)

Letter from Dr. Karl Thurn, University of Laibach, to Professor Albrecht Aigen, Brunn University.

My dear friend:

Your information about the elder Schweeringen received. The information about his prediction is interesting. I could wish that it were complete, but that would seem to be hopeless. Your question, asked in a manner suggesting great disturbance, is another matter. I will answer it as well as I can, my friend, but please remember that you asked. I volunteer nothing. The question of the rise and power of The Leader is your research, not mine.

Here is my answer. Years back an American researcher named Rhine obtained seemingly conclusive proof that telepathy took place. Tonight he would have a "sender," here, attempt to transmit some item telepathically to a "receiver," there. Tomorrow morning he would compare the record of what the "sender" had attempted to transmit, with the record of what the "receiver" considered he had received. The correspondence was far greater than chance. He considered that telepathy was proven.

But then Rhine made tests for precognition. He secured proof that some persons could predict with greater - than - probability frequency that some particular event, to be determined by chance, would take place tomorrow. He secured excellent evidence for precognition.

Then it was realized that if one could foresee what dice would read tomorrow—dice not yet thrown—one should be able to read what a report would read tomorrow—a report not yet written. In short, if one can foreknow what a comparison will reveal, telepathy before the comparison is unproven. In proving precognition, he had destroyed his evidence for telepathy.

It appears that something similar has happened, which our correspondence has brought out. Young Schweeringen predicted what a computer would report from unknown numerals and instructions. In order for the computer to match his predictions, it had to err. It did. Therefore one reasons that he did not predict what the computer would produce. The computer produced what he predicted. In effect, what appeared to be foreknowledge was psychokinesis—the

same phenomenon as the movement of crumbs of cheese by my rat. One may strongly suspect that when young Herr Schweeringen knew in advance what the computer would say, he actually knew in advance what he could make it say. It is possible that one can consciously know in advance only what one can unconsciously bring about. If one can bring about only minor happenings, one can never predict great ones.

This is my answer to your question. I would like very much to know what the elder Schweeringen predicted that The Leader would accomplish!

My she-dog has died. We had a new attendant in the laboratory. He fed her to excess. She died of it. (Et cetera.)

Letter from Professor Albrecht Aigen to Dr. Th
My dear Karl:

I have resolved to dismiss psionic ability from my investigation into The Leader's rise to power. This much I will concede: The Leader could enslave--englamour—enchant anyone who met him personally. He did. To a lesser degree, this irresistible persuasiveness is a characteristic of many successful swindlers. But he could not have englamoured the whole nation. He did not meet enough persons personally to make his regime possible, unless he could cause other persons to apply their own magnetism to further his ambitions, and they others and others and so on—like an endless series of magnets magnetized originally from one. This is not possible. I restrict myself to normal, plausible hypotheses--of which so far I have no faintest trace.

You agree with me, do you not—that it was impossible for The Leader to weave a web of enchantment over the whole nation by his own psi energies controlling the psi energies of others? I would welcome your assurance that it could not be.

Letter from Professor Albrecht Aigen to Dr. Karl Thurn.
My dear Karl:

Did you receive my last letter? I am anxious to have your assurance that it was impossible that The Leader could englamour the whole nation by his psionic gifts.

Telegram, Dr. Albrecht Aigen to Dr. Karl Thurn.

Karl, as you are my friend, answer me!

Letter, Dr. Karl Thurn to Professor Albrecht Aigen.

. . . But what have you discovered, my friend, that you are afraid to face?

Letter, Professor Albrecht Aigen to Dr. Karl Thurn.
My dear Karl:

I appeal to you because I have discovered how nearly our nation and the whole world escaped horrors beside which those of The Leader's actual regime would seem trivial. Give me reasons, arguments, proofs beyond question, which I can put into

my report on his career! I must demonstrate beyond question that psi ability did not cause his ascendancy! Help me to contrive a lie which will keep anyone, ever, from dreaming that psi ability can be used to seize a government and a nation. It could seize the world more terribly . . .

I cannot express the urgency of this need! There are others who possess The Leader's powers in a lesser degree. They must remain only swindlers and such, without ambitions to rule, or they might study The Leader's career as Napoleon studied Alexander's. There must be no hint, anywhere, of the secret I have discovered. There must be nothing to lead to the least thought of it! The Leader could have multiplied his power ten-thousand-fold! Another like him must never learn how it could be done!

I beg your help, Karl! I am shaken. I am terrified. I wish that I had not undertaken this research. I wish it almost as desperately as I wish that The Leader had never been born!

Letter from Colonel Sigmund Knoeller, retired, to Professor Albrecht Aigen, Brunn University.

Herr Professor:

In response to your authorized request for information about certain events; I have the honor to inform you that at the time you mention I was Major in command of the Second Battalion of the 161st Infantry Regiment, assigned to guard duty about the residence of The Leader. Actual guard duty was performed by the secret police. My battalion merely provided sentries around the perimeter of the residence, and at certain places within.

On August 19th I received a command to march three companies of my men into the residence, to receive orders from The Leader in person. This command was issued by the Herr General Breyer, attached to The Leader as a military aide.

I led my men inside according to the orders, guided by the orderly who had brought them. I entered an inner courtyard. There was disturbance. People moved about in a disorderly fashion and chattered agitatedly. This was astonishing in The Leader's residence. I marched up to General Breyer, who stood outside a group biting his nails. I saluted and said: "Major Knoeller reporting for orders, Herr General."

There was then confusion in the nearby squabbling group. A man burst out of it and waved his arms at me. He looked like The Leader. He cried shrilly:

"Arrest these men! All of them! Then shoot them!"

I looked at the Herr General Breyer. He bit his nails. The man who looked so much like The Leader foamed at the mouth. But he was not The Leader. That is, in every respect he resembled The Leader to whom I owed loyalty as did everyone. But no one who was ever in The Leader's presence failed to know it. There was

a feeling. One knew to the inmost part of one's soul that he was The Leader who must be reverenced and obeyed. But one did not feel that way about this man, though he resembled The Leader so strongly.

"Arrest them!" shrilled the man ferociously. "I command it! I am The Leader! Shoot them!"

When I still waited for General Breyer to give me orders, the man shrieked at the troopers. He commanded them to kill General Breyer and all the rest, including me. And if he had been The Leader they would have obeyed. But he was not. So my men stood stiffly at attention, waiting for my orders or General Breyer's.

There was now complete silence in the courtyard. The formerly squabbling men watched as if astonished. As if they did not believe their eyes. But I waited for General Breyer to give his commands.

The man screamed in a terrible, frustrated rage. He waved his arms wildly. He foamed at the mouth and shrieked at me. I waited for orders from General Breyer. After a long time he ceased to bite his nails and said in a strange voice:

"You had better have this man placed in confinement, Major Knoeller. See that he is not injured. Double all guards and mount machine guns in case of rioting outside. Dismiss!"

I obeyed my commands. My men took the struggling, still-shrieking man and put him in a cell in the guardhouse. There was a drunken private there, awaiting court-martial. He was roused and annoyed when his new companion shrieked and screamed and shook the bars of the door. He kicked the man who looked so much like The Leader. I then had the civilian placed in a separate cell, but he continued to rave incoherently until I had the regimental surgeon give him an injection to quiet him. He sank into drugged sleep with foam about his lips.

He looked remarkably like The Leader. I have never seen such a resemblance! But he was not The Leader or we would have known him.

There was no disturbance outside the residence. The doubled guards and the mounted machine guns were not needed.

I am, Herr Professor, (Et cetera.)

Letter, with enclosure, from Professor Albrecht Aigen, Brunn University, to Dr. Karl Thurn, University of Laibach.

My dear Karl:

Because of past sharing in my research, you will realize what the enclosed means. It is part of the report of the physicians who examined The Leader three days after his confinement in a military prison. He had recovered much of his self-control. He spoke with precision. He appeared even calm, though he was confused in some matters. The doctors addressed him as "My Leader" because he refused to reply otherwise.

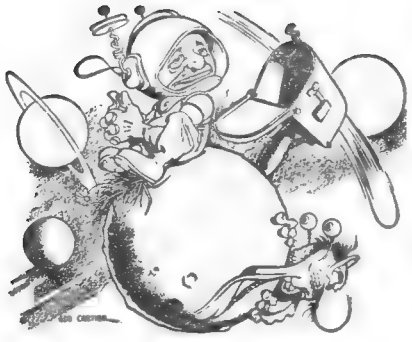
(Enclosure)

*Dr. Kundmann:* But, My Leader, we do not understand what has happened! You were terribly disturbed. You were even . . . even confused in your behavior! Can you tell us what took place?

*The Leader:* I suffered a great danger and a temporary damage. That villain Schweeringen— I shot him. It was a mistake. I should have had him worked over—at length!

*Dr. Messner:* My Leader, will you be so good as to tell us the nature of the danger and the damage?

*The Leader:* Schweeringen probably told someone what he would propose to me. It was his conviction that because of my special gifts I could cause anyone, not only to obey me, but to pour out to me, directly, his inmost thoughts and memories. Of course this is true. The danger was that of the contact of my mind with an inferior one. But I allowed Schweeringen to persuade me that I should risk even this for the service of my people. Therefore I contacted the mind of Prime Minister Winston, so I could know every scheme and every plan he might have or know to exist to injure my people. I intended, however, to cause him to become loyal to me—though I would later have had him shot. Schweeringen had betrayed me, though. When I made contact with Winston's mind, it was not only inferior, but diseased! There was a contagion which temporarily affected the delicate balance of my intuition. For a short time I

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could not know, as ordinarily, what was best for my people.

(End of Enclosure)

You will see, my dear Karl, what took place. To you and to me this explains everything. In the background of my research and your information it is clear. Fortunately, The Leader's mind was unstable. The strain and shock of so unparalleled experience as complete knowledge of another brain's contents destroyed his rationality. He became insane. Insane, he no longer had the psi gifts by which he had seized and degraded our nation. He ceased to be The Leader.

But you will see that this must be hidden! Another monster like The Leader, or Napoleon—perhaps even lesser monsters—could attempt the same feat. But they might be less unstable! They might be able to invade the mind of any human being, anywhere, and drain it of any secret or impress upon it any desire or command, however revolting. You see, Karl, why this must never become known! It must be hidden forever.

Letter from Dr. Karl Thurn, University of Laibach, to Professor Albrecht Aigen, Brunn University.

My dear friend:

I am relieved! I feared for your judgment. I thought that perhaps overwork and frustration had set up an anxiety-block to make you cease your work. But you are quite right. Your analysis is brilliant. And now that you have pointed it out, unquestionably a man with The Leader's psi powers could force another man's brain to transmit all its contents to him.

But consider the consequences! Consider the conditions of such an event. One's brain is designed to work within one's own skull, dealing with sensory messages and the like. Very occasionally it acts outside, shifting crumbs of cheese and confusing computers—and securing candy. But even when one's will controls outside actions, it does not fuse with the outside brain or thing. It molds or moves the recipient mind, but there is never a sharing of memory. You have explained why.

Consider what must happen if a brain of limited power and essentially emotional operation is linked to another and more powerful one. Assume for a moment that my she-dog had linked her brain to yours, even momentarily. Do you realize that she would not have gotten your memories, much less your power to reason? She would not even have acquired your knowledge of the meaning of words! When a bright light shines in your eyes, you see nothing else. When thunder rolls in your ears, you do not hear the ticking of a clock. When you suffer pain, you do not notice a feather's tickle. If my she-dog had linked her mind to yours, she would have experienced something which is knowledge more firmly fixed and more continuously known than anything else in your

conscious life. This overwhelmingly strong conviction would have been so powerful and so positive that it would be imprinted — branded — burned into every cell of her brain. She could never get it out.

But in receiving this overwhelming experience she would not get your memories or power to reason or even your personality. She would have experienced only your identity. She would have received only the conviction that she was yourself! She would have been like those poor lunatics who believe that they are Napoleon, though they have nothing of Napoleon in them but the conviction of identity. They do not know when he was born or have more than the vaguest notion of what he did, but they try to act as who he was—according to their own ideas of how Napoleon would act in their situation. This is how my she-dog would have behaved.

I am relieved. You have explained everything. Your letter gave me the suspicion. I secured a transcript of the Herr Doctor's report for myself. My suspicion became a certainty. You will find the clue in the report. Consider: The Leader had had the experience I imagined for my she-dog. He had linked his mind with a stronger one and a greater personality —if it must be said, a greater man. For a moment The Leader knew what that man knew most certainly, with most profound conviction, with most positive knowledge. It was burned into his brain. He could never get it out. He did not secure that other man's memories or knowledge or ability. He was blinded, deafened, dazed by the overwhelming conviction that the other man had of his own identity. It would not be possible for him to get anything else from a stronger mind and a greater person. Nor could anyone else succeed where he failed, my friend! There is no danger of any man seizing the world by seizing the minds of all his fellows! One who tries will meet the fate of The Leader.

You realize what that fate was, of course. He suddenly ceased to be the monster who could cast a spell of blind adoration for himself. He ceased to be The Leader! So the doctors gave him truth-serum so he would not try to conceal anything from them. The result is in the transcript on the third page beyond the place you quoted to me. There the doctors asked The Leader who he was. Read his answer, my friend! It proves everything! He said:

"I am Prime Minister Winston."

THE END

# THE REFERENCE LIBRARY

By P. SCHUYLER MILLER

## NOMINATIONS, PLEASE

BETWEEN now and May 1st, all of you have the opportunity to file your nominations for the best science fiction and fantasy performances of 1959. I am emphasizing this again—as I suppose I should have done every year—because I think it is important that the vote which determines the winners of the "Hugos" should be as large as possible and as representative as possible. It is through these annual awards, made at the World Science Fiction Conventions, that the science fiction/fantasy "family" recognizes top performance in writing, in editing, in art, in drama, and in fan publishing.

You'll note that I said *nominations* must be in by May 1st. This is because past committees have found that there is only one way of getting a clear selection—by a double ballot. The nominating ballot, open January 1, 1960, is intended to boil down

the contenders in each class to the top two or three. You might call this the equivalent of a primary election. Then, in June, the real ballot will go out with the names of the candidates. Who they are is something that I won't be able to tell you through this department; publishing schedules don't give us that much margin of time before the votes have to be in. After all, the Pittcon Committee has to tally the votes and get award plaques engraved well before the Pittsburgh Convention, Labor Day weekend, September 3rd, 4th and 5th.

Detroit finally made sense out of the confusing time limits that have plagued other award years, and Pittsburgh is following their example. Awards will be made for performance during 1959. In the case of stories in this and other magazines, this means in issues *dated* January through December, 1959, no matter when the issue went on sale. With books, hardbacked or paperbound, it's *first publication* in 1959 that counts. This rule prevents James Blish from taking a second Hugo for his "A Case of Conscience," which was published by Faber and Faber, in England, in a hard-bound edition after the paperback won the 1958 award.

Pittsburgh has been able to get the last six of the original Hugos designed by Ben Jason for the Cleveland convention in 1955—so there will be "full" awards in six categories. If others are necessary, we'll find a way.

First category is "Best Novel" of 1959. This covers serials published during the year, hard-bound books, and paperbacks—and one-shot "novels," complete in a single issue of a magazine. I'm free to admit that this class bothers me, because it seems that the *real* candidates will be serials and paperback books. I'm afraid that original hard-cover novels just won't stand a chance, for the simple reason that most of the people voting won't have read them. Magazines you buy, and paperbacks you buy, but a mighty small minority of you buy "real" books—and that minority is probably too small to put across the best of novels. I hope you'll prove I'm wrong.

Experience in other years has been that there's confusion between novelettes—which are now often called "novels"—and short stories. Consequently, we've combined them: there is one award for long fiction, and one for short. This does not rule out *original* short fiction appearing for the first time during 1959 in a paperback or hard-bound collection, but it's primarily a magazine-fiction award.

In the field of the drama, we may be in trouble—happily so, in a sense. Hollywood's conception of what science fiction is has been so outrageously dreadful that there was a resounding vote of "No Award!" last year. So Pittsburgh has broadened the field, and wants your nominations of best film, *or* stage play, *or* radio program, *or* TV program released during 1959. The trouble

is that '59 may turn out to be the year with good entries in both film and television fields—which would mean a scattered vote. Grapevine shows a good few active fans plugging hard for Harry Belafonte's "The World, the Flesh and the Devil"—if you can't overlook those evaporating corpses, it's still superior fantasy—and if "On the Beach" gets general release before the end of the year, it may be a better contender than the book was. Then, my TV-watching friends tell me, there are two superior TV series going strong this fall: "Twilight Zone," which is mixed SF and fantasy, and "Man in Space." I have a feeling all four may get on the final ballot.

Three categories are left: best professional science fiction or fantasy magazine, best professional artist, and best fanzine. Astounding won so consistently that John Campbell's mantle must be a little lopsided, but *Fantasy and Science Fiction* horned in for the last two years. Frank Kelly Freas also has his armload of chrome-plated rockets, mostly earned for his work right here in these pages—but he's doing less work these days, and maybe someone else will edge him out in '59. As for the best fanzine, that's a world of wonder in itself: I'm still dazed at the excellence and variety of what I saw in Detroit.

You can send your nominations to me, in care of the magazine, or to the Pittcon Committee, c/o Dirce S. Archer, 1453 Barnsdale Street, Pittsburgh 17, Pennsylvania. Include your return address on these nominations: we'll want to send you the second, final ballot in June. And perhaps John Campbell won't rule out a plug here for the Convention itself—the best we can put on for you, with James Blish as Guest-of-Honor, Isaac Asimov as Toastmaster-in-Chief, and high lights on the high lights. The $2.00 registration fee will get you three progress reports, the first out about the time you read this, another in June, and a third in August. These tell you in detail what to expect, give hotel rates, and so on. You get the program booklet, of course. You get a membership card. And there may be more. Most important, you make the Convention itself possible.

I am Treasurer of the Committee, but we hope you'll use the Pittcon address that I've already given you. This keeps all the records in one place, and assures that you get prompt acknowledgment and the first Progress Report.

* * *

There's a good chance that the Pittcon Committee may have to come up with some other kind of special award for fan-published material, outside the category of regular magazines. We're sticking to our standards and awarding the Hugo to some regularly published fanzine such as "Fanac"—the 1958 winner —or "JDArgassy," or "Shangri L'Affaires," or "Yandro," or "Amra," or any of a dozen more you know better than I. Consistently

good work is what merits the award. But this is also going to be the year of outstanding "one-shot" publications such as Donald Tuck's "A Handbook of Science Fiction and Fantasy," or Perri Press' supplement to the "Index to the Science Fiction Magazines," or another fabulous job that I found in Detroit: Rick Eney's "Fancyclopedia II."

I use "fabulous" advisedly, and not as a superannuated teen-ager who never forgot Tom Swift and John Carter. I never saw the first "Fancyclopedia," but even if the trail was blazed, this is a marvelous job of nutshelling the foibles, feuds, jargon and personalities of science fiction fandom with keen humor, with ripe corn, with the whetted needle, with the brazen knucks. I was dipping into it for bedside reading, until I found I wasn't getting any sleep or reading anything else. Now a bookseller friend is trying to persuade the editor/publisher to sell him a copy. You will get it—a fat, well mimeographed, somewhat illustrated handbook to a world some of you never imagined—for $1.25, sent to Rick Eney at 417 Fort Hunt Road, Alexandria, Virginia. I hope he sells out.

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ALIENS 4, by Theodore Sturgeon. Avon Books No. T-304. 1959. 224 pp. 35¢

If you didn't grab this—or any Sturgeon title—the moment you saw it on the stand, you're crazy. Since we lag some months behind publication here, I trust Avon keeps it in print. The contents are two major novelettes, one minor one, and one very minor fantasy.

Opening the book is "Killdozer!" The exclamation point is in the title, but it would have been there anyway. I don't know how often I've read the story since it first appeared here in Astounding in 1944, but I'll go right on reading it every time it is reprinted. In a way, it is perhaps the most "un-Sturgeonish" of all the author's stories in that he makes you feel and understand the workings of earth-moving machinery—I gather he is reproducing personal experience. Although the menace is a bulldozer savagely animated by a "living" force field from the far past, which sets out to hunt down and destroy the work crew on a Pacific island, the real story is in the complex interrelationship of the men and their machines, which enables them to defeat it. There's been a little tinkering with this version to up-date it. A producer-director team who played this story straight could make the drive-ins shriek. The 'dozer is far more terrible than any Hollywood monster I've seen, or the English horribles either.

The other top-notch story is right in Sturgeon's present groove of the relationships in a group of human beings—call it "syzygy," as he has, or whatever you like. "The (Widget), the (Wadget), and Boff," from the November and December 1955 *Fantasy and Science Fiction,* takes two extraterrestrials into a small city

boardinghouse, where they try to stir into action the submerged "Synapse Beta Sub Sixteen," which Man alone keeps submerged. The people in the house emerge as real people, and if the story hasn't the power of "More Than Human," it's still highly unusual. In this case I wish the editor, or someone, had lopped out part of the synopsis to the second installment, which bursts into the middle of the story.

*Venture* for May '58 contributed the third-ranking story, "The Comedian's Children." Again this is a superior job of writing, with a situation and characters that stand out well fleshed and breathing. A mysterious disease, brought to Earth from Japetus, is striking down small children all over the world. A popular comedian sets up a Foundation to care for them and find a cure—but he runs it as a monopoly, driving out other physicians with well-planned, subsidized ridicule. Then a few people decide to go to Japetus, in defiance of Heri Gonza and the current laws, to strike at the source of the disease. I rate this third only because the plot and its solution are a little too formal, and because Gonza as a comedian is too unbelievable, though as a man he is a highly complex person.

The slight fantasy of a kind of dryad of the cactus jungles, "Cactus Dance," is from a 1954 *Luke Short's Western*. Lord knows I don't remember much about the world into which I was born, and I've never been in the southwest, but the professors of the story sound more like consciously stereotyped 1912ers than real ones.

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ON THE TRACK OF UNKNOWN ANIMALS, by Bernard Heuvelmans. Hill and Wang, New York. 1959. 558 pp. $6.95

If you have enjoyed the several books in Willy Ley's "adventures of a romantic zoologist"—which should be out in an omnibus volume before you see this—you'll find this fat book by a Belgian zoologist, jazz musician and columnist every bit as interesting, and different in many ways. Nor has its author exhausted his stock of strange lore about improbable and possible fauna; a companion book on sea creatures is on its way.

As might be expected, Dr. Heuvelmans writes about most of the same strange creatures that we met in "The Dodo, the Lungfish and the Unicorn," "Dragons in Amber," and Willy Ley's other books. Willy gets full credit for his uncoveries and conclusions in relation to the *sirrush*, the horned dragon of the Babylonian bas-reliefs. But Heuvelmans goes much farther, documents his reports more exhaustively—and occasionally rather exhaustingly—and covers more ground.

The theme of the book is the title of its first chapter: "there are lost worlds everywhere." The author points out, and repeats at every opportunity, the one unanswerable comment on zoologists' stock response to

reports of strange, large animals. Mammoths, saber-tooth tigers, dinosaurs, and such can't be still with us, because the era when they did thrive was too long ago. Well, Heuvelmans says, there are many animals around that have survived practically unchanged for far longer than such critters, and there are many more that "everybody" knew about for years—except the zoologists.

Is the Abominable Snowman a surviving subhuman akin to Gigantopithecus? Are there furry, pigmy survivals of other early races in the forests of Sumatra, Ceylon and Africa? Are there stray dinosaurs and other monsters in the Congo? Is there an unknown, man-sized ape in Venezuela. (Its photograph is the frontispiece of the book)? Do snakes really grow as lage as natives and explorers insist—too big, in fact, to lug back to zoos? Take it from Dr. Heuvelmans: there are still wonders in this world of ours.

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A HANDBOOK OF SCIENCE FICTION AND FANTASY, compiled by Donald E. Tuck, U.S. Agent: Howard De Vore, 4705 Weddel St., Dearborn, Michigan. 1959. 2 vol.—396 pp. $6.50

Donald Tuck's "Handbook" was one of the monuments of fan bibliography in its first edition, and is even more so in its present two volumes of legal-size mimeographed information, with well glued-on stiff paper covers. When you know that the compiler lives in Lindisfarne, Tasmania, connected with the rest of fandom primarily by trans-planetary mails, you'll have some idea of the job Tuck has done.

Let me say at once that there are errors—some of them rather bone-headed errors, such as making it "Hubert" rather than Herbert George Wells who wrote "War of the Worlds." But Tuck is aware of these and is asking for additions and corrections. Don't just sit there griping—set the man straight!

For your $6.50—the price I'm taking from *Science Fiction Times,* since Tuck didn't give me one—you get a compendium of material, much of which you won't find anywhere else. It is not complete, and the author doesn't pretend it is: you won't, for example, find a list of everything Burroughs ever wrote. You will get a running index of book titles, contents of anthologies, pen names of authors, personality notes and biographical details, magazine sources for many stories, including British and Australian books and magazines that many of you probably never heard of, any more than I had. You'll get a series of fat appendices, including a checklist of the magazines and when they appeared; a section on "connected stories, series and sequels" in which it isn't always clear which is which; a publisher listing; and a listing of paperbacks.

There is vastly more information about science fiction and fantasy here than in any of the other bibliographical classics, such as the two Day

(Donald and Brad) indexes, or the Bleiler-Dikty "Checklist." Errors or not, it's certainly worth the price of a few hours in the local pub.

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PATH OF UNREASON, by George O. Smith. Gnome Press, Hicksville, N. Y. 1959. 185 pp. $3.00

According to Donald Tuck's "Handbook," George O. Smith has spent some twenty years as an electronics engineer. For this and other magazines, he has written some of the best "hard" science fiction we have—such as his "Venus Equilateral"—and unabashed action yarns like "Hellflower." This new book is a mystery with a lady-or-the-tiger twist, over which I am sure the author will be delighted to have you arguing *ad infinitum*.

James Forrest Carroll is one of the country's top physicists, and the latest in a long series of noted scientists who have gone to pieces, mentally and physically, while trying to explain the mysterious "Lawson Radiation" that is streaming in from outer space. His crackup takes the form of amnesia —and of what his superiors look upon as systematic hallucinations of people who just aren't there to anyone else.

With Carroll we hunt down the sources of the mystery—come upon a secret underground of space people —develop a matter transport by copying one of their devices. We go triumphantly to reveal all to the authorities, only to have the whole structure neatly explained out from under us. Is the Lawson Radiation a kind of Cerenkov radiation caused by great ships traveling through the galaxy at speeds greater than that of light? Or is the once brilliant physicist a broken mass of paranoid delusions, persecuting people he believes are persecuting him?

Carroll becomes exasperatingly pigheaded in his attempts to bull through his ideas on his unsupported say-so. Maybe this is one of the author's subtle little tricks to leave you uncertain on the last page. Is the heroine Rhinegallis from Outer Space—or is she just a nice girl named Rita Ellis, with a very protective brother?

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SCIENCE-FICTION AND FANTASY FILM CHECKLIST, by Walter W. Lee, Jr., 2519 Armacost Avenue, Los Angeles 64, California.

Copies of this multilithed list—sixty pages plus fifteen of additions and corrections—may still be available from the author, at the address given, for $1.00. Lee, who has put out at least one previous edition, is anxious to get comments and corrections; he thinks his list is more accurate than some of the standard film histories, but admits freely that it still has its flaws. You'll have less reason and more right to find fault with the book on which he is working, if you help him with this preliminary work.

For each film listed you get such information as the producer, date of release, stars and/or director, type

of film. Walt Lee's aim is to track down all feature-length science fiction and fantasy films released in the United States up to the time of publication—in this edition, to the Summer of 1958. There is only a selection of the best cartoons, religious films, and comedies with fantasy content. Some straight horror is included, and it seems to me that some of the borderline entries are pretty far-fetched. Even so, it's a grand job of work, and if you have any knowledge at all of lesser-known films, especially the old silent ones, get in touch with Lee whether you buy his checklist or not.

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THE HIDDEN PLANET, edited by Donald A. Wollheim. Ace Books, New York. No. D-354. 190 pp. 35¢

Marty Greenberg of Gnome Press seems to have let his excellent theme anthologies lapse, but the torch has been picked up by the paperback publishers, and especially by Donald Wollheim, who is the master of Ace's SF shelf. This five-story compendium of adventures on Venus, though only half what you'd get for the same money in a regulation Ace Double, is still well worth the price.

Two of the stories—in fact, the two oldest—have established themselves as classics. They are Lester del Rey's "Luck of Ignatz," here in Astounding back in 1940, and Stanley G. Weinbaum's "The Lotus Eaters," here in 1935. Del Rey's is the lightly delightful story about the Venusian snail-lizard who draws down an aura of bad luck around his adopted master, while Weinbaum's—his second for Astounding after the overnight success of his first short stories—introduces that cerebral vegetable, Oscar, who can deduce the universe from one fact. They are less novel than they were twenty years ago—even the poorest science fiction is better-written nowadays—but still grand fun.

Chad Oliver's "Field Expedient," which opens the book, is SF-modern-style, translating anthropological concepts into plot and some action. For personal reasons never really spelled out, an eccentric tycoon is buying up children and shipping them to Venus to create a swarm of isolated cultures that range from the hunting-gathering stage to technological civilization. Earth has reached a state of serene stagnation, and the Foundation is deliberately creating young, unadjusted, rival societies that will one day be ready to jolt the Old Folks into a new cycle of growing civilization. The story was here in 1954.

J. T. McIntosh's "Venus Mission" is the shortest and poorest of the five, a rather routine "perilous journey" adventure through the fogs of Venus, hounded by the fiendish Greys. What interest there is comes from the alleged hero's seemingly irrational behavior. On the other hand, Leigh Brackett in "Terror Out of Space" has handled stereotyped plot elements of the period with superb craftsmanship, weaving a SF-fantasy of subsea life forms that owes a little to Mer-

ritt and perhaps to C. L. Moore, but has a strange realism of its own.

We can use more collections like this one.

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THE 100th MILLENNIUM, by John Brunner

EDGE OF TIME, by David Grinnell. Ace Books, New York. No. D-362. 110+145 pp. 35¢

This is one of the biggest bargains from Ace in some time, mainly for the original half by an English writer who is growing more and more popular at home, and should start making his mark here. The reprint half you'll spot as last year's Avalon hardback with an original theme that just missed being outstanding: scientists who create a galaxy-in-miniature, whose evolution they can watch through millennia that pass like seconds.

John Brunner's story, fairly short, is a vision of the far future that has something of Dunsany's early tales of the lands at the edge of the twilight, something of Arthur Clarke's poetic self in "Childhood's End" and "The City and the Stars." The cover, incidentally, is a piece of phony sensationalism that has nothing to do with the story.

We are taken to a city of the 100th millennium, when our time is long forgotten—even as are the names of the first pre-Neanderthal chieftains to us—and to the city of historic dabblers, each dreaming in his favorite bit of the past in the great, vegetable House of History, then reliving it in a daydream world whose subtle decadence cuts as deeply as anything Fritz Leiber has shown us. Creohan, restless dilettante at astronomy, learns that a star will smash into the Earth in a century or so; he sets out only to find someone who cares, then in company with the girl, Chalyth, and others whom they encounter, begins to scour his unknown world for people who can do something to save his world.

The nightmarish fascination of this distant future Earth is a creepily beautiful job of story-telling that haunts you long after the book is laid down. Perhaps it lets down a little in the final pages, but there is a final secret-within-a-secret that forbids you to stop before the end. I hope we have more stories like this from John Brunner—or from anyone else who can write them as well as he.

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THE INVOLUNTARY IMMORTALS, by Rog Phillips. Avalon Books, New York. 1959. 223 pp. $2.75

I haven't, needless to say, gone back to *Fantastic Adventures* for December, 1949 to see how much the original one-shot story has been changed, if at all, in converting it to book form. Probably not much, or the publisher wouldn't have credited the original copyright.

If you can swallow a string of coincidences that couldn't happen anywhere but in real life, the result is a fast-moving chase melodrama

with a final "secret" that is also pretty lame. Purely as entertainment, however, the momentum of the plot may carry you over such things without too much pain.

Helen Ranston is one of a batch of accidental immortals, who were made so by some mysterious event back in 1848. Since she never seems to get past her twenties in physical age, she has outlasted three husbands, and when her latest dies she has to flee from her daughter's superstitious vengeance. By coincidence No. 1, her seatmate on the train is another Immortal, whom she "recognizes" almost immediately . . . and the chase is on.

In Chicago, Helen is introduced into an enclave of immortals, working in a big laboratory to track down the lost secret. Her vengeful daughter and a mysterious crime lord—who later turns out to be another vengeful offspring—start hounding them, and there is a wholesale blowup that sends Helen and three companions running for cover. With the Big Shot pulling political and financial strings, the whole country is soon roused against them. Problem: to find what was in Grant's Home Remedy in the Spring of 1848, that made hundreds of people who took it immortal.

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ENCOUNTER, by J. Hunter Holly. Avalon Books, New York. 1959. 224 pp. $2.75.

This story turns out to be far better than it has any right to be, thanks to a "hero" who is about as convincingly nasty a chunk of extraterrestrial humanity as you'd want to find married to your fiancée. The plot is old and the situations not too unusual, but the cat-loving author makes them do a job for him.

A spacecraft crashes in the Ozarks; a manlike, or perhaps fully human, creature is rescued from it, and nursed back to hulking manhood by a simple hill couple. He destroys them, and starts a trail of blood and shattered skulls that winds across the country into a college town in Michigan.

Here a young psychologist, Ray Harper, and a writer friend, Will Purdom, are trying to unravel the multiple mysteries in a chain of brutal murders that have led up to the death of the head of Ray's department, Professor Grayson. They uncover the track of a strange, contradictory man who called himself "Ezekiel," and slowly follow it to the doorstep of a powerful and fascinating stranger, Peter Kiel, who has snatched Grayson's daughter, Carol, away from Ray and married her. Only a wonderful cat named Mr. Chips—and the reader—know that Peter Kiel, alias Ezekiel, is the ruthless human monster from the stars.

But in the last half of the book the hunt is in the open. Ray and Will know who, if not what, they are hunting, and are struggling to pierce Kiel's telepathic barricades and at the same time to protect themselves and Carol. It is a bloody battle to the very end, tense, suspenseful, and with no

holds barred. If it is filmed by an imaginative and competent producer-director team comparable to the Val Lewton-Jacques Tourneur team who once worked for RKO, the last ten pages of the book should make a scene that will send the drive-in audiences screaming for bright lights and more popcorn.

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# SECOND COMINGS

MAN OF MANY MINDS, by E. Everett Evans. Pyramid Books, No. G-458. 1959. 192 pp. 35¢

Reprint of a run-of-the-mill telepathic adventure yarn. Space Cadet George Hanlon is framed out of the Interstellar Corps so he can use his telepathic powers in intelligence work.

THE STAR OF LIFE, by Edmond Hamilton. Crest Books No. S-329. 1959. 187 pp. 35¢

Kirk Hammond dies on the first manned flight into Space, only to come to life centuries later and take part in the struggle for immortality between the Vramen and the Hoomen.

TROUBLED STAR, by George O. Smith. Beacon Books No. 256. 1959. 159 pp. 35¢

Unless you remembered the title or spotted the author's name, you'd never find this reprint down among the sex novels, where its cover puts it. Dusty Britton, TV space-hero, has to outdo himself to fend off the invaders from Marandis.

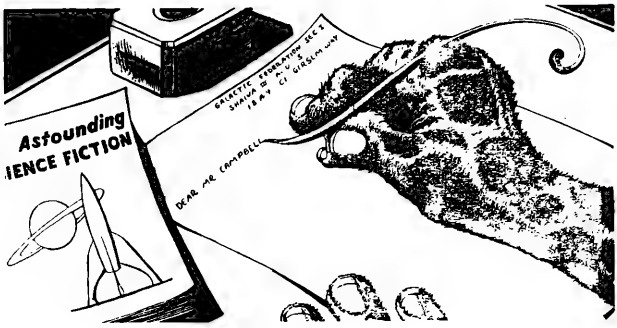
A TOUCH OF STRANGE, by Theodore Sturgeon. Berkley Books No. G-280. 1959. 174 pp. 35¢

Any Sturgeon collection is a "must," and this one is also good, though not his best. Two of the nine stories in the original Doubleday edition—"The Pod in the Barrier" and "The Girl Had Guts"—have been omitted in this reprint.

A JOURNEY TO THE CENTER OF THE EARTH, by Jules Verne. Ace Books No. D-397. 1959. 256 pp. 35¢
Perma Books No. M-4161. 1959. 263 pp. 35¢

To cash in on the publicity for the forthcoming Twentieth Century-Fox film version of Verne's best SF adventure, two paperback publishers have editions on the stands. Ace's is a reprint, with a new number but the same cover, of their 1956 edition; it is a new translation. Perma Books are using a 1923 Scribner edition as their source, and have a cover that indicates the film—with Pat Boone and Arlene Dahl—will be colorful if not Verne. I hope it's better than the changeling that replaced "From the Earth to the Moon"!

THE END




# BRASS TACKS

Dear John:

A couple of paragraphs from a reader since 1939.

First—pages 78 and 80 of *Scientific American*, July, 1959. Expounds on Dirac's application of the Pauli principle. Seems that everything exists in an ordinary or an extraordinary state. The ordinary state is what you and I and all about us is made of. The extraordinary state particles, on the other hand, have negative energy as well as negative mass, and are more stable than particles in the ordinary state. So that ". . . quantum levels representing the extraordinary states of elementary particles are already completely filled, and the ordinary particles with which we deal in our everyday physical world are simply the excess that cannot be accommodated at the lower energy levels because of the Pauli principle!" Which gives a scientific basis for the "next-door" space-time plot. And how about the Hieronymus machine, and psi in general, operating by some sort of means through this all-pervading extraordinary universe? (I didn't say "propagate through"—that has too many implications.)

Last — *American Scientist* June 1959, whole of the first article, especially page 160 to end. Measure metabolism of potato under constant conditions of light, temperature, pressure, humidity, et cetera. The metabolic changes, even though sealed off, will tell you (1) how fast the barometric pressure was changing

24—28 hours ago, (2) outside air temperature, (3) amplitude of background radiation a day ago, (4) lunar monthly cycles, and, as if that were not enough, the potato will (5) indicate the form of the barometric pressure two days before the event! Maybe the farmer was right in planting at certain phases of the moon; one of the charts in the article shows a fifteen per cent difference in metabolism between new moon and full moon. As far as indicating atmospheric pressure two days from now, well . . . maybe we're in a universe where anything can happen, after all. —Hector E. French, 9 Davidson Road, Wakefield, Massachusetts.

*At last! The psi instrument that does not entail a human operator—The Precognitive Potato!*

---

Dear Sirs:

A few years ago I ran into an incident that illustrates what author Mayfield is getting at in his story "Handling the Data."

During a lecture before a large group of people microbes were shown on a screen by a picture slide device to illustrate the lethal effects of ultraviolet light. The first test killed the microbes on schedule. The second test failed even though it was repeated a few minutes after the first with the same equipment and with the same intent.

The biggest change between the two tests was the attitude of the people present. Here is something the Duke University people might be interested in.—A. O. Tshirner, 320 Broadway, Santa Cruz, California.

1. *Any experiment, to be a scientific experiment, must be repeatable.*
2. *Only truly scientific experiments are significant or meaningful.*
3. *This experiment wasn't repeatable.*
4. *Therefore it is unscientific and hence meaningless.*
5. *You shouldn't mention such things in polite company, sir! It smacks of witchcraft!*

---

Dear Mr. Campbell:

In your editorial in the November Astounding you tell a number of truths that are unpopular among 101% Americans.

It is sad but true that just as there are a great percentage of allegedly human beings that do not want to think for themselves, there are also great numbers, who prefer to be owned instead of being their own master. Natural born slaves and serfs.

Our system of self-government rests on the assumption that men do think for themselves and do want to be their own masters, free men. It will not, and cannot, work in a population that prefers serfdom and ignorance.

Any man who does not desire to be a free man, and who will not, if enslaved by force, seize any opportunity to kill his master and escape, does not deserve to be given freedom unearned, he should remain a

slave, and castrated to insure that he breeds no more like unto him.

You can not say that such an individual has evolved from a lower form of life, he has devolved into something lower in character than any other anthropoid.

I disagree that an American pioneer would have been a fool not to move out of the "Indian-infested" frontier into modern Russia. On the frontier, he was a free man, and that was worth more than physical ease and comfort.

In the fable, the wolf was hungry and cold, but the dog had the mark of the collar on his neck. The wolf was feared but the cur dog was kicked.

You can not build a strong wall of soft mud, nor a strong nation of men so soft that they prefer to be comfortable rather than free. It takes hard, tough, dangerous men to make a really strong and free nation.—Arthur George Smith, 65 North Foster Street, Norwalk, Ohio.

*Too bad things aren't that simple! Remember that Aesop, who was neither coward nor fool, was a slave. Try, sometime, getting an exact, objective (not merely in terms of things-I-don't-like!) definition of slavery; it isn't quite so simple as you may think. I am a slave; I must labor to support in idleness my "masters." If I seek to escape this burden, the police will arrest me, and haul me back. My "masters" toil not, neither do they spin—they play most of the day. They are my children.*

*But they are my slaves; they are forced, under threat of bodily punishment, to labor at tasks not of their choosing, and if they seek to escape from me, will be arrested and returned by force. They are not permitted to determine their own fate. They are forced to submit to physical torture; willy-nilly, they are hauled off to the dentist.*

*True, the dog bears the mark of the collar, and dogs have indeed been kicked. But . . . "Love me; love my dog!" Is the dog properly described as a "slave" or as "a symbiote"?*

---

Dear Mr. Campbell:

In regard to Jean Buntin's letter in the September Astounding, I ran into the same reactions that she did, only from the other end. I have accepted the findings of Dr. Rhine for many years but until last April I refused to "believe" in divining rods or similar gadgets. At that time a good friend of mine told me he had been experimenting with a set of rods for several weeks and had obtained positive results a startling percentage of times. Naturally, being a student of physics, I laughed in his face.

When he brought a set of rods to school the next day, I laughed even harder and challenged him to a trial run under controlled conditions in the school physics lab. He agreed,

and we set up the experiment during physics class that day. The physics teacher was on my side. My friend tried the experiment under conditions which I had stipulated, and got positive results.

I still refused to accept the evidence, as did my teacher. However, Pete challenged me to try the rods myself. It seemed the only fair thing to do, and the best possible way to prove Pete was either faking or crazy. To my humiliation, the rods worked for me exactly as predicted. Let me say, though, that I have never been so glad to be embarrassed.

Several of us performed many experiments in the following weeks including a tracing of pipes, conduits, cables, or—something, under the floor of our school cafeteria. But the only time we could find to work in that place was during lunch. Nonetheless, the rods continue to perform beautifully for about fifty per cent of the subjects involved. Additional experiments showed that if the rods, made from clothes hanger wire, were placed in blocks of wood, the properties of the wood in no way affected the operation of the rods, as long as the operator held the wood blocks or a frame holding the blocks. The one experiment which we would like to have been able to do was to make a frame for the rods and set up devices to measure the force exerted by the effect, whatever produces it. To my mind, the fact that it does produce a measurable force makes it physics and as legitimate a field of investigation as electronics, nucleonics, or any other of the realms of modern research.

It might interest Miss Buntin to know that the students who engaged in these experiments at Highland High in Albuquerque are what is normally considered the "more intelligent" group as four of them placed in the "top 20" in the New Mexico statewide physics competition, two boys received General Motors National Scholarships, one girl received a National Merit Scholarship, and one of the GM winners (me) also received first place in that state physics competition.

In the light of what I have read in Astounding the last few years, does the fact that I insisted upon concrete evidence, or at least first-person evidence, reveal anything about me? Perhaps that my mind is not an open one? It better not as I'm attending Stanford University this fall majoring in physics.

In any event, we convinced one math teacher, one biology teacher, an entire physics class, and most of a cafeteria full of students that somehow divining rods DO work. But Mr. Neece, the physics teacher, still thinks we're nuts.—Peter D. Zimmerman, W5ECG/6 & 7, Student Member, American Rocket Society, 301 W. Cleveland, Las Vegas, Nevada.

*A mind should have a doorway—but that doesn't mean it should be without walls of any kind, so that any vagrant breeze can blow through! The truly "closed mind"*

*is the one which has walls, and a doorway that's been boarded over; not even direct experimental evidence can penetrate such a mind.*

*As to measuring the physical force involved: Aren't the rods themselves excellent force-indicators? The major problem is this: as little as 1° tilt will cause the rods to swing—but no one, walking along, can hold his hands steady to within less than 1°. The high moment of inertia of the rods, however, keeps them from swinging much to such short-duration random tilts; the swing is produced when the center of vibration shifts. You might say the rods detect a "DC bias" in the presence of considerable "AC noise". A physical measurement system seeking to find the force involved would need to make allowance for an extremely high "noise level" that completely swamped out the "signal." The rods represent a very simple solution to the problem—a time-integration method of separating signal from short-term random noise.*

---

Dear Sir:

For some time I have been reading Astounding and comparing it to *Scientific American.* I have come to the conclusion that the titles of the two magazines must be interchanged.

To paraphrase the statements attributed to Mr. Wilson, formerly Secretary of Defense, "research is groping for a black cat in a dark room at night." "When you don't know what you're doing, that's research." Well, we all agree with this, and some of us consider that this sort of groping is absolutely essential to our progress.

If then, we accept Wilson's definition, then Astounding, which deals with the limits of man's knowledge—albeit in fictional form—is really *Scientific American.* Whereas *Scientific American,* which deals with the fantastic *results* of research (Land's epochal theory on color!) is really Astounding! However, I'll not quibble—I enjoy and value highly both of the magazines!

To carry on with your new policy re addition of new articles—what you are looking for is a good old-fashioned "shadchan" (marriage broker.) In my firm ELECTRODESIGN (details on request) we have been acting thus for quite some time. We are a firm of electronic instrumentation sales engineers and we sell instruments across the board. Very often we find that an instrument developed for the paper industry has value in textiles and medicine—and vice versa! We have become catalysts—crossing all industrial requirements.—Harry Schwartz, 5212 King Edward Avenue, Montreal 29, Canada.

*There is, many times, so much resistance to the cross-over "marriage" of two fields of work that perhaps a shotgun rather than a "shadchan" is required.*

THE END

(*Continued from page 7*)
forces involved believe that such adventures will ever pass beyond the realms of fancy."

In a way it kind of reminds me of an old Harold Lloyd comedy, in which Lloyd had been given, by his dear old Grandma, a wonderful mystic charm that made him immune to dangers. Harold promptly set out on deeds of deering-do that no sane adventurer would have attempted, warm and secure in his sure knowledge of his possession of a Truth that protected him. At the end, of course, Grandma put the handle back on her umbrella where it had come from in the first place.

Who among us wants to give up that warm certainty of knowing the Truth? In the old movie, Harold Lloyd became utterly frantic, naturally, every time he dropped his wonderful protective charm—every time he discovered the Truth was not right there with him. It's much more frightening to face the Universe without the protective charm of having the Truth.

Atomic weapons were perfectly wonderful things, back in 1946-47, when *we* had them, and *they* didn't. They were a private Truth that protected and secured us.

As I say, in the movie, Harold Lloyd did things that no sane adventurer would attempt. False security can lead to outrageously dangerous efforts.

The difficulty is that while we *need* more than one term referring to the great concept-family now lumped under "truth," we want *not* to have them.

Let's try it anyway. Let's use the term "truth" to refer only, solely, and invariably to Absolute Ultimate Law and Fact. "Truth" shall refer to that which in absolute actuality *is*.

It immediately becomes apparent that no human being ever did, does, or ever will know the Truth. Truth exists entirely beyond the possibility of human knowledge. Heisenberg's Uncertainty Principle represents a special case, but the situation is, actually, general; to determine Truth, one must observe it, and Heisenberg has shown that the act of observation itself alters that which was to have been observed.

Then in a major respect, the Russian concept of *pravda* is closer to Truth than our concept "truth"; no human being can ever know or state anything but an opinion, based on observation. There is, in absolute Truth, a Law of Gravity. Newton's Law of Gravity, however, was not a statement of Truth; it was, instead, a statement of . . . what shall we use? Let's take the old term *logos,* The Word. And let's recognize it means, essentially, "an informed and educated guess, based on the observational material now available," and nothing more nor less than that.

No human statement, belief, conviction, opinion, or consensus is ever Truth; only logos can be stated, observed, thought, discussed, or considered.

But immediately a second problem becomes apparent. Consider the statement "The English word *night* is

spelled n-i-g-h-t." That statement is absolutely, ultimately valid. It is a logos statement which is an absolute; there is no observational-error question, no doubt-factor. It is, in a very specific way, a Truth.

Reason: a logos statement is a human statement; a logos statement about a logos-fact can be a special class of Truth—for in the realm of things created by human decision, human decision *is* the Absolute Ultimate Law.

Logos-facts have the peculiar characteristic of being nonconservative, unlike Universe Truth-facts. They can be created and destroyed; they did not exist before human beings generated them, and they cease to exist when human beings decide to annihilate them. Universe-facts, on the contrary, existed before human beings existed, exist with or without human consent, and can neither be created nor destroyed by human decision.

Moulton's statements anent space flight were logos statements; his error was to think they were Truths.

The statement about the spelling of "night" is a logos statement; the Liberal Artist makes the mistake of thinking that, since logos statements are nonconservative, Truths are also nonconservative. Having only one term in the language means that, to translate the above statement into standard English, we must say, "The Liberal Artist makes the mistake of thinking that, since Truths are nonconservative, Truths are also nonconservative." Put that way, the basis of the Liberal Artist's confusion is perfectly obvious.

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This confusion has led to the highly interesting situation of a State Legislature passing a bill to make the value of *pi* exactly equal to 3.0000 . . . within their state. After all, if Congress can make the value of gold thirty-five dollars an ounce, why can't they make the value of *pi* 3.00000... ?

Because Congress can generate and annihilate nonconservative logos; that's their proper business But they can't generate or destroy conservative Truth (Which statement translated into English-as-she-is-spoke, comes out "Congress can generate or annihilate Truths; that's their proper business. But they can't generate or destroy Truths." Which certainly looks like the maunderings of a nut, doesn't it?)

The Liberal Artist, oriented in the field of humanics primarily, identifies Truth primarily with logos; the physical scientist, on the other hand, identifies Truth with the particular class of logos statements that are strongly correlated with Truths, and has a totally different conception of what the English term "truth" means. Discussion between them, consequently, has a tendency to be as futile as discussion between a Spanish-speaking Yankee talking about "a deserted village" in terms of "pueblo," and a Latin-American trying to get some sense out of this schizophrenic nonsense about "the beautiful old depopulated population."

And where, in all this, does the science-fictioneer stand?

Unlike the Liberal Artist, he does have a realization that Truths exist, which are not subject to human manipulation. And unlike far too many scientists, he doesn't think that logos statements are Truth . . . except at the special level of human-generated facts.

It is an absolute, ultimate-law *fact* that "night" is correctly spelled n-i-g-h-t, because facts of that genus *are* human-generated. But they are also human-destroyed; a few decades hence it may be an absolute fact that the word is spelled n-i-t-e. And that, too, will then be an absolute, ultimate-law fact.

The problem is to explain to a Liberal Artist that this change is *not* of the same variety as the change from Newton's Law of Gravity to Einstein's Law of Gravity.

Can you define accurately and clearly what the difference is?

THE EDITOR.

THE END

★ ★ ★ ★ ★

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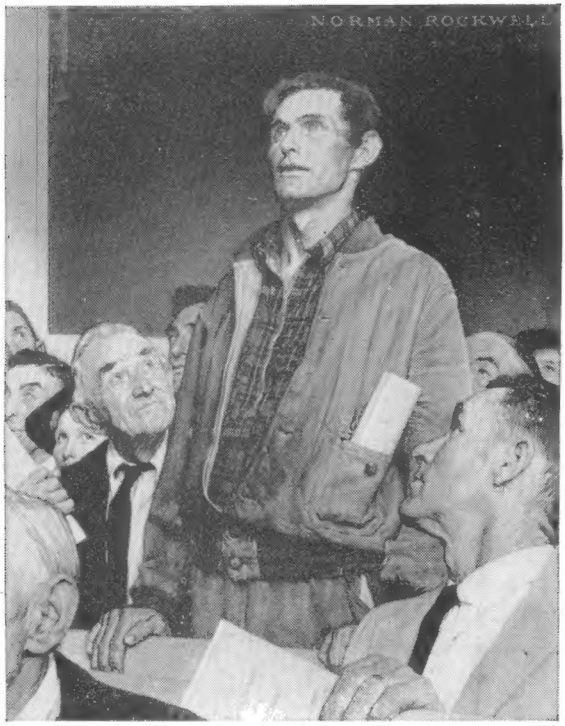


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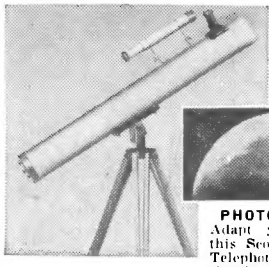

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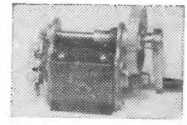

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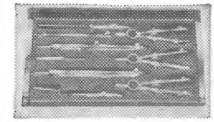

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